

NANCY T. BURBIDGE
AND MAX GRAY



FLORA
of the A.C.T.



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*Flora of the
Australian Capital Territory*

Flora of the



*Australian
Capital
Territory*

NANCY T. BURBIDGE
AND MAX GRAY

with illustrations by Nancy T. Burbidge

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Also by Nancy T. Burbidge

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Title page drawing is of *Eucalyptus melliodora* ('Yellow Box')

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Canberra 1969

N.T.B.
M.G.

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INTRODUCTION

It was originally intended that this should be a handbook for use in schools and by those members of the general public interested in the natural features of the world around them. The establishment of a Department of Botany at the Australian National University led to a change of emphasis since it became desirable to prepare a text suitable for students working at the tertiary level. In trying to meet such a wide range of interests there is always the risk that targets will be missed but an attempt has been made to provide a simple text which can meet the needs of the non-specialist while at the same time including either facts or references to sources of facts that may be needed by the more serious student. Unfortunately there is no modern Flora of Australia available for consultation and much basic data is scattered among scientific journals not easily available to everyone. There has been important progress in research for the preparation of regional floras for the various States of the Commonwealth. The authors of this account of the plants of the Australian Capital Territory have been greatly assisted by help from colleagues in State herbaria and by the published results of their work.

The Territory officially consists of two areas, that associated with the National Capital and a second area at Jervis Bay on the coast of New South Wales. The coastal type flora of the latter has few species in common with the inland area and is, in the main, covered by the *Handbook of the Vascular Plants of the Sydney District and Blue Mountains* by Beadle, Evans, and Carolin (1962). It has therefore been excluded from the present account. On the whole there has been a fairly strict adherence to species definitely known to occur within the area associated with the National Capital (see map) though this is not a natural botanical province. There are very few species wholly restricted to it, most are also found in neighbouring areas of the Southern Tablelands or in the Kosciusko region, if not distributed even more widely.

To increase the general applicability of the book references to distribution in other parts of Australia have been included. For the most part this is through generalised reference to States. It should, however, be realised that plant distributions are closely related to climatic and geographic zones. Because the A.C.T. lies in the Tablelands region of New South Wales its flora is related to that of other Tablelands areas and of the ranges of eastern Australia with their extension into Victoria. Political demarcations between mainland States are of no botanical importance but Bass Strait is a geographic boundary and because of the special interest of the links revealed by plant distribution Tasmania has been treated as a distinctive area.

The cataloguing of plant species occurring within the A.C.T. is not a simple task. Canberra is one of the most rapidly developing cities of Australia. Areas which now carry natural bush will in a few years time be covered by suburbs. Not only will native plants disappear but there will be changes in the representation of introduced and naturalised species. New alien plants are reported each year. A number of these arrive with plants brought in for new gardens and many will fail to persist, since they may prove unable to survive the cold winters, but others, now known only from isolated occurrences, may increase to extremely common weeds as the years pass.

Since our knowledge of the plants of south-eastern Australia has increased, and is increasing, certain changes in the names used for our species are unavoidable. In some cases names formerly used have been found to be misapplied, i.e. our plants differ from those to which the name was originally given. In others it has been shown that the name is incorrect under the Rules of Nomenclature established since it came into use in the last century. In order to assist readers familiar with such misapplied or incorrect names they are included as synonyms, with their appropriate cross references, in the index. For the benefit of students who wish to check the reasons for such changes a bibliography of relevant scientific works is also included. Common names have been provided where possible even though in many cases they are 'contrived' rather than of true popular or folk origin. It is a matter for continued regret that we have lost almost all the aboriginal names from the past.

The sections on Juncaceae, Orchidaceae, and Cyperaceae were prepared by M. Gray.

LAYOUT AND USE OF THE TEXT

The text deals only with seed plants, that is with conifers (of which there are only two species) and the flowering plants. It may be possible to cover the Cryptogams in a later volume. Keys to genera, including those of the Fleshy Fungi, Mosses, and Ferns, were given in CSIRO Division of Plant Industry Technical Publication No. 21 under the title 'The Plants of the A.C.T.' (1965) but these keys have been considerably revised since they were published.

This work is arranged in a series of keys which are dichotomous throughout. The reader is always faced with an 'either or' decision. Thus characters under '1' are to be compared with those under '1a', under '2' with '2a', '3' with '3a' and so on. Species descriptions have been incorporated in the keys but in these the important diagnostic characters are printed in italics. The reader should check these emphasised features before reading the whole description.

The families have been arranged in accordance with the system originally prepared by Engler and Gilg, though modifications resulting from modern research have been incorporated. Following this widely used system is largely a matter of convenience and does not necessarily imply that it is regarded as the best in terms of expressing evolutionary progress or interrelationships.

Use of botanical terms is unavoidable but these have been kept to a minimum. A glossary covering their meanings is provided at the end of the text.

A discussion of habitats in the A.C.T. is provided below. Some species tend to occur within altitudinal zones rather than in particular types of habitat. For these the following arbitrary levels have been recognised:

Low	up to 2500 ft
Intermediate	from approx. 2500 to approx. 4500 ft
High	4500 ft and above

Naturalised species are marked with an asterisk.

NOTES ON THE VEGETATION OF THE A.C.T.

The first detailed account of the flora of our area was published by Cambage in *Proc. Linn. Soc. N.S.W.*, 43: 673-711 (1918), where notes on the earliest known European visitors are also provided as well as information about geology, climate, and soil. More recent botanical accounts were prepared by Professor L. D. Pryor for the ANZAAS Handbook to the A.C.T. (1939) and for *The Nation's Capital*, ed. H. L. White, for the ANZAAS Conference of 1954.

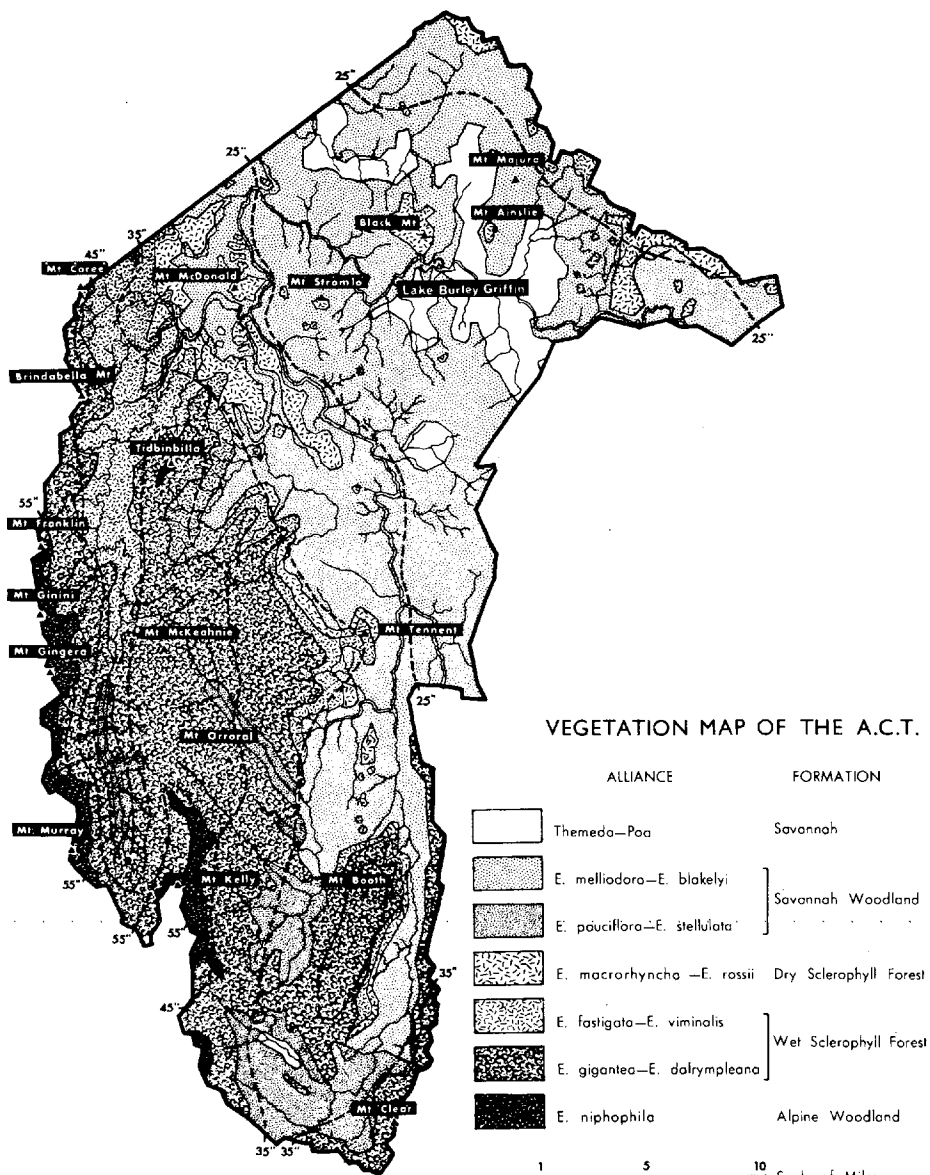
Cambage lists 299 species and varieties which he recorded in November and December 1911 and January 1912. As he realised, this did not represent the whole flora but it was a worthy effort for a botanist working on horseback in country without roads or well marked tracks. The additional records added since his survey and included in this account can be analysed as follows:

	Families	Genera	Species
Gymnospermae	2	2	2
Angiospermae			
Monocotyledoneae	18 (1)	114 (34)	352 (82)
Dicotyledoneae	72 (8)	296 (97)	683 (207)
Totals	92 (9)	412 (131)	1035 (289)

The figures in parentheses indicate naturalised taxa. Thus there are nine families represented only by naturalised species introduced to Australia, 131 genera are also so limited, but the 289 naturalised species are divided between the 131 genera and genera which are represented by both native and introduced species.

In a geographic sense the A.C.T. is not a distinctive botanical region. It lies to the south of the boundary of the Hawkesbury Sandstone Flora so characteristic of the Blue Mountains and few species occur in both areas. On the other hand there are a number of subalpine plants also found in the Australian and Victorian Alps and in Tasmania. Some of our mountain species show affinities with those of more coastal areas to the east while in our dry forest habitats there are a few western species which here reach the eastern limits of their distribution (*Casuarina luehmannii*, *Brachychiton populneum*, and *Acacia doratoxylon*). To some extent this mingling of floristic elements reflects our geographic position and the diversity of habitats and altitude but it is also possible that it is due to migration of species in response to climatic changes in the past. With either wetter or drier conditions different species would be able to live in this area and some might persist despite the ebb and flow from one climatic extreme to the other.

The diversity of habitat influences distribution of plants through (1) differences in altitude with which there are related variations in rainfall and temperature; (2) differences in aspect since eastern and southern slopes are usually cooler and receive more rain than those facing west or north while on slopes at high elevations plants must withstand colder temperatures as well as strong winds in both winter and summer; (3) differences in soil which are of more local importance, though in association with slope their moisture holding capacity and rate of run-off is often significant.



FROM: PRYOR, 1954. (*E. gigantea* = *E. delegatensis*)

In general it is altitude which is most obviously linked with zonation in our vegetation, as can be readily seen by anyone travelling from Canberra to Mt Franklin, but this zonation is locally affected by aspect and slope. Plants able to tolerate dry conditions reach higher levels on western and northern slopes than on cooler slopes where conditions are suitable for the denser growth of wet forest.

For an account of the ecology of the A.C.T. the reader is advised to consult that given by Pryor in *Canberra, a Nation's Capital*, pp. 162-76 where the classification of our vegetation into various categories is described. For the present only the broader features of the main zones need to be discussed and these are also shown in the accompanying map.

Grassland: The original treeless plains of low altitudes have been severely affected by agricultural and pastoral use. None of the original type in which *Stipa* ('Spear Grass') and *Danthonia* ('Wallaby Grass') communities were more or less dominated by *Themeda* ('Kangaroo Grass') remains in an undisturbed state. Over much of the area the plant cover consists of introduced grasses and weeds with an often sparse distribution of native species.

High altitude grassland, in which *Poa* ('Snow Grass') is dominant, is not well-developed in the A.C.T. though suitable conditions for it are approached in the upper part of the Naas Valley. Extensive grassland of this type may be observed to the south of the A.C.T.

Savannah Woodland: The two types found in the A.C.T. are linked with altitudinal differences. The low altitude type covers much of the north-eastern and eastern parts of the A.C.T., though clearing has reduced the original distribution. Its boundary with grassland (either still present or represented by isolated trees in cleared areas) may be marked by a line of *Eucalyptus pauciflora* ('White Sally' type) or of *E. rubida* ('Candlebark'). This occurrence of trees tolerant of low temperatures reflects the effect of a temperature inversion, the heavier frosts and low-lying masses of cold air contributing to the inhibition of tree growth on the plains. The common trees in savannah woodland are *E. melliodora* ('Yellow Box') and *E. polyanthemos* ('Red Box') with *E. blakelyi* ('Blakely's Red Gum') on lower or poorly drained sites and *E. bridgesiana* ('Apple Box') near the creeks. Along major creeks and rivers where there is alluvial sand *Casuarina cunninghamiana* ('River Oak') is to be found though in many places it has been removed and replaced by the introduced *Salix babylonica* L. ('Weeping Willow').

The higher altitude woodland is dominated by *E. stellulata* ('Black Sally') and *E. pauciflora* ('Snow Gum'). This type is found in the broad open valleys of the southern parts of the A.C.T. and in some high mountain valleys.

Dry Sclerophyll Forest: The term 'sclerophyll' is formed of Greek words meaning 'hard-leaf'. Dry sclerophyll forest covers most of the higher ground adjacent to the woodland below 2000 ft. In these areas the common trees are *E. dives* ('Broad-leaved Peppermint'), *E. mannifera* subsp. *maculosa* ('White Brittle' or 'Red Spotted Gum'), *E. rossii* ('Scribbly Gum') and *E. macrorhyncha* ('Red Stringybark') with *E. bridgesiana* along the creeks. This type can be seen on Black Mountain and Mt Ainslie or Mt Majura. Dry forest is also found on northern and western facing slopes in the mountains where the trees are usually *E. dives* and *E. mannifera* subsp. *maculosa* with *E. robertsonii* ('Narrow-leaved Peppermint') and *E. viminalis* ('Ribbon' or 'Manna Gum') in the lower parts of the gullies as at Five Crossings and in the Tidbinbilla Reserve.

With a rise in altitude or a change to a cooler slope both *E. viminalis* and *E. robertsonii* become more conspicuous and are joined by *E. fastigata* ('Brown Barrel'). This marks a change to the next forest type.

Wet Sclerophyll Forest: *E. viminalis* continues to occupy the banks of creeks in the mountain gullies but on the slopes *E. fastigata* and, at a higher level, *E. delegatensis* ('Alpine Ash') are the dominant forest trees. Shrub growth is dense with tall plants to 15 ft high including thickets of *Bedfordia salicina*, *Olearia argophylla*, *Pomaderris aspera*, *Leptospermum lanigerum* s.l., and a slender form of *Acacia dealbata*.

The upper margin of the Alpine Ash passes into a forest of *E. dalrympleana* ('Mountain Gum') and *E. pauciflora* ('Snow Gum') in which there is a marked reduction in the height and changes in the species content of the shrub layer. This subalpine forest type passes into the next zone.

Subalpine or Alpine Woodland: The common tree species is *E. pauciflora* which at high levels takes on the habit of the form which has been referred to as *E. niphophila* ('Alpine Snow Gum'). The trees may be close together or broken into thickets separated by grassed areas dominated by *Poa*. There is a rich assortment of perennial herbs including species of *Brachycome*, *Helichrysum*, *Helipterum*, *Podolepis*, *Euphrasia*, *Epilobium*, *Velleia*, and *Styloidium* which produce a fine show in January and February.

A particularly interesting flora in the alpine woodland zone is found near and in the sphagnum swamps. Heath communities around the borders of the swamps include species of *Baeckea*, *Drimys*, *Epacris*, *Olearia*, *Callistemon*, and *Leptospermum*. Within the swamps interesting species include *Richea continentis*, *Helichrysum hookeri*, *Orites lancifolia*, *Comesperma retusum*, *Restio australis*, and *Neopaxia australasica* among many others.

Within the various vegetation zones listed above and shown on the map there are various types less extensive in occurrence. Some of these are discussed by Pryor in the work referred to above and as their special interest is ecological they are not treated in detail in these notes.

KEY TO MAJOR GROUPS IN THE PLANT KINGDOM

1. Plants without seeds, reproducing by minute spores. (Algae, Fungi, Lichenes, Bryophyta, Pteridophyta). Not treated in this book.

CRYPTOGAMAE

- 1a. Plants reproducing by seeds; stems with woody tissue; true roots developed.

PHANEROGAMAE

2. Seeds not enclosed in an ovary, commonly attached to the scales of a cone but in *Podocarpus* the single seed is attached to a fleshy cone scale; plants commonly with characteristic resinous 'pine' odour.

GYMNOSPERMAE

- 2a. Seeds enclosed in an ovary which, in its early stages, forms part of a flower or floret.

ANGIOSPERMAE

3. Leaves usually with parallel veins; stems herbaceous or wiry, often jointed; flower parts in 3s (except in *Potamogeton*).

Monocotyledoneae

- 3a. Leaves with pinnate or reticulate veins; stems woody or herbaceous; flower parts in 4s or 5s (rarely in 3s or less).

Dicotyledoneae

GYMNOSPERMAE

1. Ovules solitary and exposed on fleshy stalk-like base (cone scale) axillary to a leaf.

PODOCARPACEAE

- 1a. Ovules in woody cones with 6 thick valves.

CUPRESSACEAE

PODOCARPACEAE

PODOCARPUS L'Hér. ex Pers.

Low growing shrubs rarely more than 60 cm. high but often several metres in diameter; leaves linear-oblong, 7-10 mm. long, obtuse, thick, aromatic when crushed; male cones in small clusters near or at ends of branchlets, about 5 mm. long; female cones consisting of solitary seed on fleshy 'receptacle' which becomes bright red. At high elevations, near or on rock outcrops or on scree slopes; sometimes growing flat against rock faces. Mt Ginini,

Mt Gingera and other subalpine habitats; also south-eastern New South Wales, eastern Victoria, and Tasmania. 'Mountain Plum Pine'. Fig. 1.

P. lawrencei J. D. Hook.

CUPRESSACEAE

CALLITRIS Vent. See *Garden (1956), Blake (1959), Thompson (1961a)*

Small tree with cypress-like habit, foliage dark green; leaves minute, in whorls of 3 arranged alternately at the nodes, angular bases decurrent on stems; male cones ovoid to obovoid, terminal or clustered at ends of small apical branchlets, scales 2-3 mm. long; female cones ovoid to globular, to 15 mm. diameter when mature, solitary or few on short fruiting branchlets; woody scales alternately long and short, each with small point on upper dorsal face; seed dark brown, with 2 narrow wings. Shallow soil of stony slopes or rock ridges; Molonglo Gorge, along Murrumbidgee River, Gininderra Gorge, Pine Island; also south-eastern Queensland, eastern New South Wales, and north-eastern Victoria. 'Black Cypress Pine'. Fig. 2.

C. endlicheri (Parl.) F. M. Bail.

ANGIOSPERMAE MONOCOTYLEDONEAE

1. Aquatic plants with trailing or floating leaves.

2. Minute plants reduced to small disc-like free-floating or submerged leaves with suspended rootlets; flowers minute and rarely seen.

LEMNACEAE (p. 90)

2a. Plants rooted in running water or mud and normally submerged though sometimes exposed by receding waters or with floating leaves. (See also *Scirpus* in Cyperaceae.)

3. Flowers enclosed in tubular spathes (at least when young); perianth segments 6 or 3; leaves submerged or with floating blades.

HYDROCHARITACEAE (p. 14)

3a. Flowers not enclosed in spathes and also without bracts but arranged in spikes or racemes.

4. Perianth segments 4, flowers in axillary spikes; stems trailing in water and wholly submerged or with floating leaf blades.

POTAMOGETONACEAE (p. 12)

4a. Perianth segments 6, flowers in racemes erect above water surface; leaves strap-like and with upper part floating.

JUNCAGINACEAE (p. 14)

1a. Land plants but including those growing in wet places or sometimes submerged but not developing aquatic leaves of the trailing or floating types, except in some *Scirpus*.

5. Perianth petaloid and often coloured in at least 1 of the 2 whorls of 3 segments; never stiff and glumaceous in both whorls.

6. Aquatic herbs with tufted erect leaves, either partly submerged or near water's edge; flowers small and numerous in bracteate panicles with whorled branches; carpels numerous in a ring.

ALISMACEAE (p. 14)

6a. Flowers solitary or in inflorescences of various types but if the branches are whorled then the plants not growing in water; ovary with 1-3 loculi.

7. Ovary superior.

8. Herbaceous plants or if stiff in habit then the perianth segments coloured and petaloid.

LILIACEAE (p. 99)

8a. Xerophytic plants with stiff strap-like or rigid angular leaves; inner perianth segments subpetaloid.

XANTHORRHOEACEAE (p. 104)

7a. Ovary inferior.

9. Perianth segments similar in shape and size, at least within each whorl of 3; pistil free from the stamens.

10. Stamens 6.

11. Flowers in umbels.

AMARYLLIDACEAE (p. 108)

11a. Flowers in racemes or solitary.

HYPOXIDACEAE (p. 108)

10a. Stamens 3.

IRIDACEAE (p. 110)

9a. Perianth segments usually not all similar, even within each whorl, often asymmetrical in shape or appearing 5 in number with the sixth forming a lip opposite the united stamens and pistil which together form the column.

ORCHIDACEAE (p. 110)

5a. Perianth absent or, if present, inconspicuous and membranous, dry or glumaceous and never petaloid.

12. Flowers very numerous (though minute) and packed together in dense cylindrical brown spikelets 1.5-3 cm. in diameter.

TYPHACEAE (p. 12)

12a. Not as in 12.

13. Small marsh plants with short soft leaves exceeded by peduncles bearing globular heads in which the flowers are hidden by very blunt or rounded greenish bracts.

ERIOCAULACEAE (p. 92)

13a. Leaves grasslike or slender and filiform or reduced to stiff or dry sheathing bases; flowers in branched inflorescences or, if in heads, then with narrow-pointed bracts or the heads not globular.

14. Small plants with filiform setaceous leaves, the flowers surrounded by white scarios scales in a terminal head within a pair of opposed pointed bracts of equal length.

CENTROLEPIDACEAE (p. 92)

14a. Not as in 14.

15. Perianth of 6 dry or glumaceous tepals, not hidden by subtending bracts.

JUNCACEAE (p. 94)

15a. Perianth absent or much reduced; flowers hidden in axils of bracts (glumes) and often developed in 'spikelets' in a compound inflorescence (rarely reduced to a single spikelet).

16. Flowers unisexual, mostly dioecious; leaf sheaths open (i.e. margins not fused).

RESTIONACEAE (p. 91)

16a. Flowers bisexual, or if unisexual then monoecious; leaf sheaths open or closed.

17. Leaf sheaths closed (i.e. margins fused); flowers in axils of single bracts (glumes) in the spikelets.

CYPERACEAE (p. 73)

- 17a. Leaf sheaths open (very rarely fused); flowers developed between 2 opposing bracts (lemma and palea) in the spikelets.

GRAMINEAE (p. 16)

TYPHACEAE

TYPHA L. See Briggs and Johnson (1968)

1. Rhizomatous plants, growing in mud, with stout erect stems to 2 metres high; leaves with sheathing bases and linear blades to 90 cm. long, *sheaths of upper 2-4 leaves with rounded auricles*; small brown elongate mucilage glands of upper inner face of sheaths usually absent from base of blade; flowers minute, unisexual, in dense cylindrical spikes; *female portion chestnut-brown, 10-18 × 3 cm. when mature*, usually only shortly separated from upper male portion from which flowers are deciduous; bracts between female flowers not numerous, sometimes almost absent, *narrow to 2-4 cells across lamina*; flowers reduced to pistil but with fine silky hairs on pedicels; sterile flowers longer than fertile and with swollen *obtuse-apiculate apices*; fertile flowers with slender style, *stigma chestnut-brown, narrow obovate to elliptical*. On shores of Lake Burley Griffin, also swampy areas along creeks and on slopes. 'Bulrush'. Fig. 3A (plant), A₁ (top of leaf sheath), A₂ (mature female spike), A₃ (bract), A₄ (male spike with upper flowers fallen), A₅ (sterile and fertile flowers), A₆ (style and stigma of fertile flower), A₇ (sterile flower).

1. *T. orientalis* Presl

1a. Similar to above but *sheaths passing obliquely into bases of blades or rarely upper 1-2 auriculate*; glands of upper inner face of sheaths usually extending on to base of blade for about 1 cm.; *when mature the female spike 12-25 × 1.5-2 cm., cinnamon-brown*, usually with gap 2-3 cm. long below male portion; bracts numerous, *broadly spatulate with 4-8 cells across lamina*; flowers as in above but *sterile flowers truncate-apiculate*, fertile flowers with *pale-brown linear stigmas*. Often growing with the above on shores of Lake Burley Griffin; widespread in America. 'Bulrush'. Fig. 3 B₁ (top of leaf sheath), B₂ (mature female spike), B₃ (bract), B₄ (sterile flower), B₅ (style and stigma of fertile flower).

2. *T. domingensis* Pers.

POTAMOGETONACEAE

POTAMOGETON L. See Thompson (1961a)

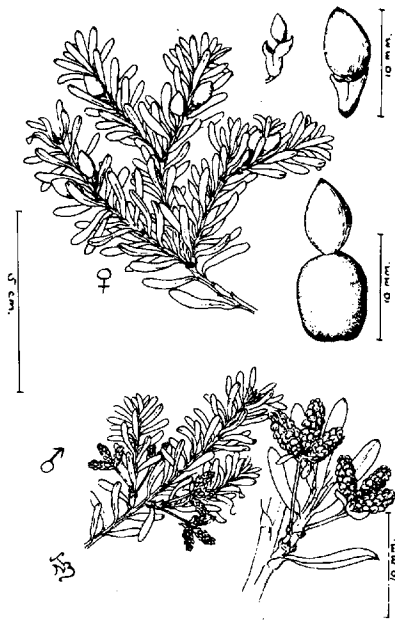
1. *Upper leaves petiolate and with floating oval or ovate blades*; plants rooted in mud in running or stagnant water, trailing near surface; lower leaves (submerged) narrow and with or without short petioles; upper leaves with blades glossy above, green or reddish, 2-10 cm. long, nerves numerous and convergent below and above; stipular membrane thin and enclosing the stem, soon becoming ragged; spikes projecting above water, 2-5 cm. long on peduncles about as long; the 4 1-seeded carpels develop 3 crenulate ridges or keels when mature. Widespread in temperate Australia and found in backwaters of creeks and rivers in the A.C.T. 'Floating Pondweed'. Fig. 4.

1. *P. tricarinatus* F. Muell. et A. Benn.

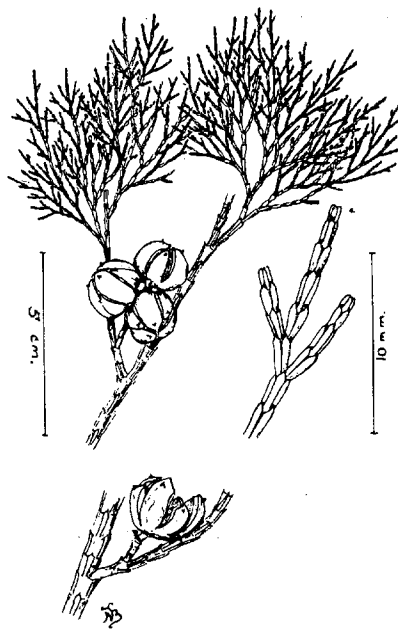
1a. All leaves submerged.

2. *Leaves ovate or lanceolate, basal portion clasping the stem, nerves parallel, pale; margins crisply undulate*; spikes pedunculate in upper axils, not much longer than leaves. In similar habitats to the preceding, e.g. Gudgenby River and other cold local streams; widespread in Tasmania, eastern Australia and in the northern hemisphere. 'Pondweed'. Fig. 5.

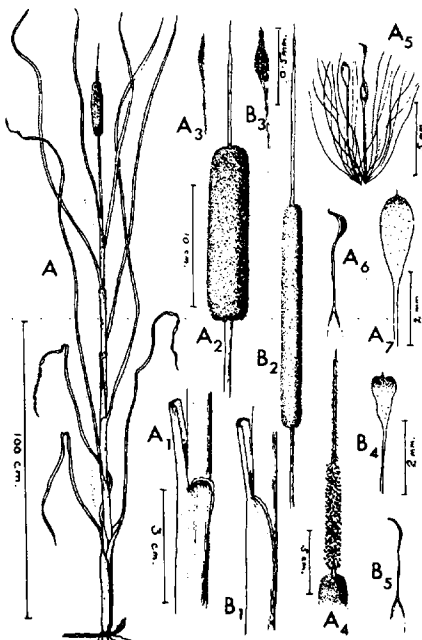
2. *P. perfoliatus* L.



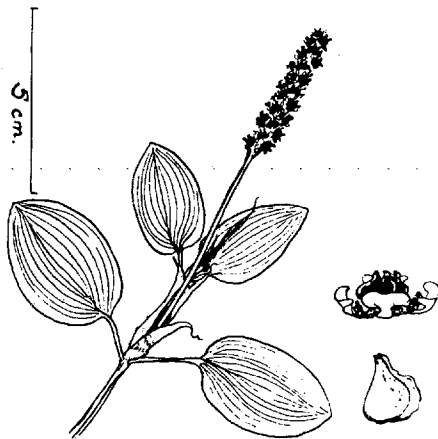
1. *Podocarpus lawrencei*



2. *Callitris endlicheri*



3. A. *Typha orientalis*
B. *Typha domingensis*



4. *Potamogeton tricarinatus*

2a. Leaves oblong linear, without broad clasping bases.

3. *Leaves oblong, margins minutely toothed*; stems more slender than in above species; *leaves with strong midrib*, submarginal nerves thin, margins coarsely or minutely undulate; spikes in upper axils, finally longer than leaves. Common in Lake Burley Griffin, also at Uriarra Crossing on Murrumbidgee River and other river sites in the A.C.T.; widespread in Australia and in northern hemisphere. 'Pondweed'. Fig. 5.

3. *P. crispus* L.

3a. *Leaves linear, often very narrow, margins entire*, obtuse; stems often branched; spikes in upper axils but rarely much longer than leaves, submerged or projecting. In habitats similar to those of above. Widespread in Australia, found in Upper Naas Creek in southern A.C.T. Also in New Zealand. 'Slender Pondweed'.

4. *P. ochreatus* Raoul

JUNCAGINACEAE

TRIGLOCHIN L. See Thompson (1961a)

Rooted in mud in shallow slow-flowing or semi-stagnant water; perennial tufted at base with the upper parts of the long linear leaves floating in long ribbons; flowers greenish in an erect raceme projecting on a stout peduncle; fruits ovoid to globular and with 6 fertile carpels which are rounded on the back and 3-nerved. Widespread throughout temperate Australia. 'Water Ribbons'. Fig. 6.

T. procera R.Br.

ALISMATACEAE

ALISMA L.

Perennial with bulbous rootstock, growing in shallow water or exposed on drying mud; leaves radical with long slender petioles and broad ovate-lanceolate or ovate-elliptical blades (sometimes cordate at base), 10-20 cm. long, 6-10 cm. wide, the apices shortly acuminate; flowers pedicellate in bracteate panicles with whorled branches and on a long erect peduncle, inner perianth segments petaloid and pale pink; carpels numerous and tightly packed in a ring. Almost cosmopolitan in distribution but occasional along river and creek banks in the A.C.T. including backwaters of Lake Burley Griffin; also New South Wales, Victoria, South Australia and New Zealand. 'Water Plantain'. Fig. 7.

A. plantago-aquatica L.

Note: *Sagittaria platyphylla* (Engelm.) J. G. Smith has become naturalised in a duck pond at Gungahlin (March 1968). It is believed to have been introduced with black ducks captured in the Northern Territory and maintained for research purposes.

HYDROCHARITACEAE

1. Leaves with oval blades on long petioles; flowers on stout peduncles ending in a broad spathe; inner perianth segments conspicuous and petaloid.

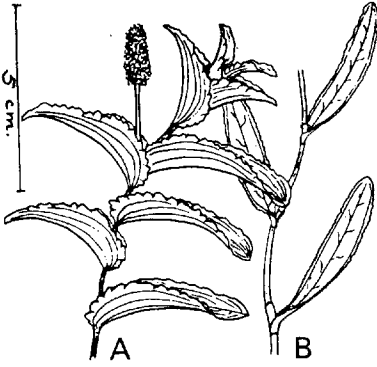
1. *Ottelia*

1a. Leaves long and straplike; flowers very small in narrow spathes terminating very long slender spirally-twisted peduncles.

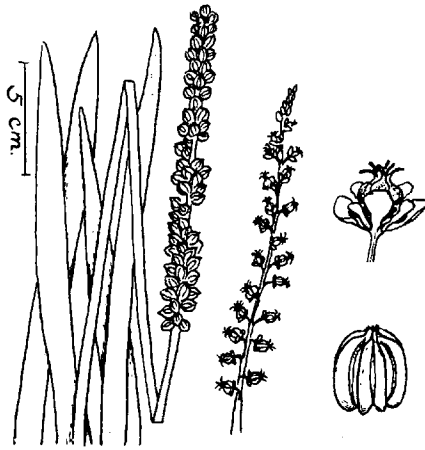
2. *Vallisneria*

1. *OTTELIA* Pers.

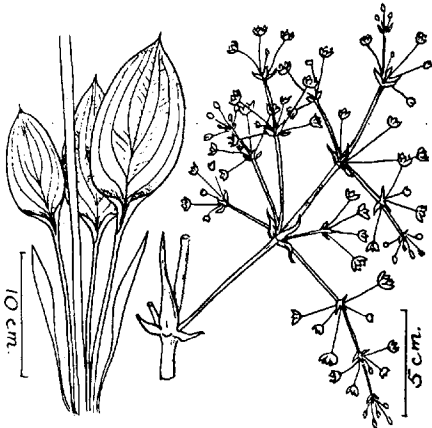
Rooted in mud in shallow water; leaves all radical, petioles long and narrowed above,



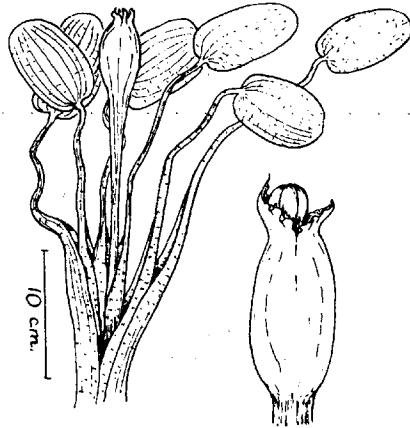
5. A. *Potamogeton perfoliatus*
 B. *Potamogeton crispus*



6. *Triglochin procera*



7. *Alisma plantago-aquatica*



8. *Ottelia ovalifolia*

blades floating ovate or oblong and obtuse; flowers solitary within a lobed tubular spathe at the end of a stout peduncle; outer perianth segments green, inner white or pale pink with red at the base (in fresh material) and nearly twice as long as outer ones; stamens 6-12, stigmas 6-8 and each 2-lobed. Shallow pools in woodland habitats of lower elevations; widespread on Australian mainland; introduced in New Zealand. 'Swamp Lily'. Fig. 8.

O. ovalifolia (R.Br.) L. C. Rich.

2. VALLISNERIA L.

Submerged stoloniferous aquatic plants with long ribbon-like leaves trailing below the surface; leaves all radical, linear, minutely toothed near apices; flowers unisexual and very small; male flowers in an ovoid head within a pedunculate spathe, females solitary in a tubular spathe on a very long peduncle which is at first tightly and spirally twisted near base of plant but extending to lift flower to water surface. After fertilisation the peduncle recoils so that seed matures near the mud in which it later germinates. Widespread in warmer and temperate regions of the world and throughout all Australian States; Molonglo and Murrumbidgee rivers and other local streams. 'Eel Weed'. Fig. 9.

V. spiralis sens. lat.

GRAMINEAE (POACEAE)

1. Spikelets breaking up at maturity or the rhachilla (axis of spikelet) fracturing above the glumes; spikelets commonly laterally compressed and with one to many florets.

Subfamily: POIDEAE

2. Spikelets with one or more fertile lemmas, empty lemma (if present) always placed above the fertile ones.
3. Spikelets borne in open, contracted or spikelike panicles but not laterally or bilaterally arranged (except in *Lolium* and *Tripogon*) nor the branches digitate or sub-digitate (except *Eleusine*).
4. Spikelets with 2 or more fertile lemmas or, if only 1 fertile, empty lemmas present above.
5. Rhachilla of the spikelets with long silky hairs; panicles plume-like. (Tribe: ARUNDINEAE.)

1. *Phragmites* (p. 22)

- 5a. Rhachilla glabrous or shortly hairy, never silky hairy between the lemmas.
6. Glumes usually shorter than the lowest lemma, never as long as whole spikelet; awns, if present, terminal or in an apical notch.
7. Ligule membranous; lemmas with 5 or more nerves evenly spaced, rarely 3-nerved. (Tribe: FESTUCEAE.)
8. Glumes and lemmas almost orbicular, concave and rounded on back.

2. *Briza* (p. 22)

- 8a. Glumes and lemmas longer than broad, rounded or keeled on back.
9. Lemmas awnless or with a terminal awn.
10. Spikelets of two kinds, sterile and fertile, densely or loosely clustered together and more or less turned to one side of the rhachis of each panicle.

3. *Cynosurus* (p. 22)

- 10a. Spikelets all of the same type in each panicle.
11. Lemmas glabrous or scabrid or pubescent on the nerves, commonly rounded on the back.
12. Panicle open or narrow, spikelets pedicellate.
13. Lemmas 5-9 nerved, scabrid and prominently nerved, apex thin and very blunt or ragged.

4. *Glyceria* (p. 24)

- 13a. Lemmas 5-nerved, nerves not prominent.
14. Lemmas smooth on back, apex obtuse; glumes unequal.
5. **Puccinellia** (p. 24)
- 14a. Lemmas scabrid on back; apex acute, acuminate or awned.
15. Glumes subequal; lemmas acuminate or with short awns; perennials.
6. **Festuca** (p. 24)
- 15a. Glumes very unequal; lemmas with slender scabrid terminal awns; annuals.
7. **Vulpia** (p. 26)
- 12a. Panicle a narrow spike with bilaterally arranged sessile spikelets.
8. **Lolium** (p. 26)
- 11a. Lemmas with midrib prominent on back, commonly woolly or silky hairy at base, apices obtuse or acute but awnless.
9. **Poa** (p. 28)
- 9a. Lemmas with an awn arising from an apical notch or from below such a notch.
16. Spikelets sessile, much compressed laterally and crowded in dense clusters at the ends of spreading branches.
10. **Dactylis** (p. 29)
- 16a. Spikelets pedicellate, not densely clustered but in open or contracted panicles.
11. **Bromus sens. lat.** (p. 29)
- 7a. Ligule a row of short hairs or cilia (a ciliate membrane in **Eleusine**); lemmas 3-nerved or (in **Eleusine**) with 3-5 nerves closely parallel along the keeled midline and with or without a separate lateral nerve on each side. (Tribe: **ERAGROSTEAEE.**)
17. Spikelets pedicellate; lemmas without awns; panicles loose and open (local species).
12. **Eragrostis** (p. 32)
- 17a. Spikelets sessile or subsessile.
18. Spikelets appressed to rhachis of a narrow spike or closely overlapping and turned to one side of a simple spike; central nerves of lemmas continued as a minute mucro.
13. **Tripogon** (p. 33)
- 18a. Spikelets densely clustered and projecting from the branches of a digitate or subdigitate panicle; lemmas strongly keeled, 3-5-nerved, nerves closely parallel along the keel, sides of lemmas thin and with or without a lateral nerve.
14. **Eleusine** (p. 33)
- 6a. Glumes as long as or longer than the lowest lemmas, often as long as the spikelet (awns excluded), if shorter than the lemmas awned from back.
19. Ligule membranous; awns, if present, developed from the back of the lemma (rarely from apical notch) and commonly bent (geniculate). (Tribe: **AVENEAE.**)
20. Spikelets less than 1 cm. long (excluding awns).
21. Awn arising from the upper third of the back of the lemma or in an apical notch.
22. Softly villous perennial; panicles milky-white tinged with pink; spikelets 2-flowered, the upper floret male (i.e. with stamens only).
15. **Holcus** (p. 33)
- 22a. Not softly villous, annual or perennial; panicles pale or brownish; not flushed with pink; spikelets with more than 2 florets.
23. Awn short, arising from an apical notch.
24. Annual.
16. **Lophochloa** (p. 34)
- 24a. Perennial.
17. **Koeleria** (p. 34)

- 23a. Awn as long as the lemma, arising from below an apical notch.
18. *Trisetum* (p. 34)
- 21a. Awn arising from the lower part of the back of the lemma; spikelets 2-flowered (one floret sometimes awnless).
25. Spikelets 12 mm. long; lemmas acute; slender delicate annuals.
19. *Aira* (p. 34)
- 25a. Spikelets 5-10 mm. long; glabrous perennials.
26. Both lemmas awned, their apices truncate; glumes longer than lemmas.
20. *Deschampsia* (p. 36)
- 26a. Lemmas acuminate, lower awned, enclosing stamens only, upper awnless, bisexual; lower glume shorter than lemmas.
21. *Arrhenatherum* (p. 36)
- 20a. Spikelets at least 1 cm. long (excluding awns) and with 2 or more fertile lemmas; glumes more than 3-nerved.
27. Lemmas denticulate at apex. Perennial.
22. *Amphibromus* (p. 36)
- 27a. Lemmas bifid at apex. Annual.
23. *Avena* (p. 38)
- 19a. Ligule a row of hairs or fine cilia.
28. Awn arising from the deeply notched apex of each lemma and from between lateral lobes which are several nerved. (Tribe: **DANTHONIEAE**.)
24. *Danthonia* (p. 38)
- 28a. Upper part of lemma divided into 9 1-nerved spreading plumose awns. (Tribe: **PAPPOPHOREAE**.)
25. *Enneapogon* (p. 43)
- 4a. Spikelets typically with 1 fertile floret (i.e. 1 lemma) and without empty lemmas.
29. Lemmas hyaline, membranous or stiff but not horny and hardened.
30. Lemma 3-5-nerved, with dorsal or terminal awn or, if awnless, the apex truncate. (Tribe: **AGROSTIDEAE**.)
31. Mature awns geniculate, sometimes twisted; panicles open or contracted, linear to lanceolate in outline, rarely oblong but if dense then the lemma awned from the back and the glumes not silky villous.
32. Panicle open and diffuse; lemma thin, truncate and with or without awn from the back.
26. *Agrostis* (p. 44)
- 32a. Panicle contracted, usually loose but if open then the slightly hardened lemma with a conspicuous awn arising near the apex.
33. Lemma with a single awn or awnless.
34. Awn arising from at least 1 mm. below the apex and usually from near or below the middle of the back of the lemma (rarely absent), once geniculate.
27. *Deyeuxia* (p. 45)
- 34a. Awn arising from between 2 minute apical lobes, commonly twice geniculate (at least when dry).
28. *Dichelachne* (p. 47)
- 33a. Lemma with 2 pairs of fine lateral straight awns and a longer twisted central awn.
29. *Pentapogon* (p. 48)
- 31a. Panicle dense, ovate-oblong or cylindroid, spikelets often more or less hidden by conspicuous straight awns.

35. Glumes scabrid, narrow lanceolate, acuminate; lemma with a stiff scabrid awn from near the bifid apex.
30. **Echinopogon** (p. 48)
- 35a. Glumes membranous or soft, glabrous, pubescent or hairy with obtuse apex narrowed abruptly into a short erect point, or a slender awn, or narrowed into a slender plumose awn; body of lemma shorter than and hidden by the glumes.
36. Glumes without plumose awns; panicle oblong, ovate-oblong or cylindroid.
37. Glumes with fine awns 2-3 times as long as base.
31. **Polypogon** (p. 50)
- 37a. Glumes with short erect rigid points.
32. **Phleum** (p. 50)
- 36a. Glumes tapering into plumose awns as long as the base; lemma with a long, geniculate awn arising between short awnlike lobes; panicle short, ovoid.
33. **Lagurus** (p. 50)
- 30a. Lemma 1-3-nerved, awnless, membranous, commonly with the grain visible through the thin tissue; spikelets minute; panicle very long, narrow (local species). (Tribe: **SPOROBOLAE.**)
34. **Sporobolus** (p. 52)
- 29a. Lemma horny, hardened, awned from the apex.
38. Lemma with a single long awn commonly twisted in its lower part, often geniculate. (Tribe: **STIPEAE.**)
39. Body of lemma slender above a narrow sharp-pointed callus.
35. **Stipa** (p. 52)
- 39a. Body of lemma short with a short blunt base.
40. Stems rigid, to more than 1 metre high; lemma glabrous, glossy when mature.
36. **Oryzopsis** (p. 54)
- 40a. Stems very short, leaves long and filiform, densely tufted; lemma scabrid, obtuse-truncate at summit.
37. **Nassella** (p. 54)
- 38a. Lemma with 3 awns from the summit of the body, or with an awn which is 3-branched above a slender column. (Tribe: **ARISTIDEAE.**)
38. **Aristida** (p. 54)
- 3a. Spikelets sessile or shortly pedicellate along one side of the rhachis, or on opposite sides of the axis of solitary spikes or racemes, or the panicle of digitate spikes. (See also **Lolium**, **Tripogon**, and **Eleusine.**)
41. Spikes narrow with spikelets arranged on either side of rhachis which is commonly jointed.
42. Lemma 5-9-nerved, hardened; spikelets not sunken in hollows along rhachis. (Tribe: **HORDEAE.**)
43. Spikelets solitary at the nodes of the rhachis, more than 3-flowered.
44. Spikelets biseriate, sometimes distant along the rhachis; lemmas acuminate, with a terminal awn. Native species.
39. **Agropyron** (p. 56)
- 44a. Spikelets densely grouped in a compressed spike; glumes and lemma obtuse or toothed, with or without awns. Cultivated cereal.
40. **Triticum** (p. 56)
- 43a. Spikelets 1-flowered or sterile and reduced to glumes, clustered in 3s at each node of the rhachis; each triplet falling as a unit; lateral spikelets commonly reduced or sterile; lemmas and glumes usually with slender scabrid terminal awns. Introduced.
41. **Hordeum** (p. 56)

- 42a. Lemma 1-3-nerved, membranous or stiff; spikelets commonly sunken into the hollows of the slender rhachis, 1-flowered; annuals. (Tribe: **MONERMEAE**.)
45. Spikelets with 1 glume facing the rhachis and the other more or less suppressed against it.
46. Spikes hairlike and curved; glumes absent against the rhachis, the other glume minute; lemmas with a fine hairlike awn.
42. **Psilurus** (p. 58)
- 46a. Spikelets about 2 mm. diameter; lemma awnless. (See also **Hemarthria**.)
43. **Monerma** (p. 58)
- 45a. Spikelets with one side of each of the 2 glumes touching the rhachis; glumes sharp-pointed; lemma membranous and awnless.
44. **Parapholis** (p. 58)
- 41a. Spikelets arranged in 1-sided digitate spikes. (See also **Eleusine**.) (Tribe: **CHLORIDEAE**.)
47. Lemmas with a terminal awn; leaves more or less conduplicate, strongly angled up the midrib.
45. **Chloris** (p. 60)
- 47a. Lemmas awnless; leaves not conduplicate nor markedly angled up the midrib.
46. **Cynodon** (p. 60)
- 2a. Spikelets with 1 terminal fertile floret and a pair of lemmas (empty or with stamens) below it; sterile lemmas sometimes minute or one absent. (Tribe: **PHALARIDEAE**.)
48. Glumes winged on the keel below the summit; empty lemmas minute, one sometimes absent.
47. **Phalaris** (p. 60)
- 48a. Glumes not winged.
49. Glumes minute, set at base of hairy rhachilla joint below the larger scabrid sterile lemmas each of which has a scabrid terminal awn; fertile lemma thin, mucronate, shorter than the sterile ones.
48. **Microlaena** (p. 60)
- 49a. Glumes at least $\frac{1}{2}$ as long as the lemmas but sometimes very unequal in size.
50. Sterile lemmas without awns; glumes and lemmas never thinly membranous.
49. **Ehrharta** (p. 62)
- 50a. Sterile lemmas with or without awns; glumes thin, membranous like the lemmas; anthers commonly visible through the thin tissue of both.
51. Glumes subequal, 2 lowest lemmas with stamens.
50. **Hierochloe** (p. 62)
- 51a. Lowest glume $\frac{1}{2}$ as long as upper; 2 lowest lemmas empty, lower with short straight awn from the middle of its back, upper with a longer geniculate awn from near its base.
51. **Anthoxanthum** (p. 62)
- 1a. Spikelets falling entire, dorsally compressed; sterile or male florets, if present, placed below the single fertile one.
- Subfamily: **PANICOIDEAE**
52. Glumes not stiffer than the fertile lemma, lower glume sometimes small or absent; fertile lemma often hardened, usually awnless; spikelets not usually paired but, if so, then both pedicellate and fertile. (Tribe: **PANICEAE**.)
53. Spikelets not surrounded by bristles.
54. Spikelets sessile or shortly pedicellate in digitate or subdigitate racemes, or sometimes only one raceme present at summit of peduncle, or the dense racemes in a short panicle.
55. Neither the upper glume nor the lower lemma awned, fertile lemma acute or obtuse.

56. Spikelets without a minute lower glume visible on the exposed side as they lie against the rachis.
57. Upper glume and sterile lemma with a conspicuous central nerve as well as the submarginal ones; rachis flattened with spikelets not more than twice as long as broad.
52. **Paspalum** (p. 62)
- 57a. Upper glume and sterile lemma without a central nerve, rachis slender, spikelets more than twice as long as broad, panicles commonly in pairs, i.e. one terminal and one slightly shorter from the uppermost axil.
53. **Axonopus** (p. 63)
- 56a. Spikelets with a minute glume visible on exposed side.
54. **Digitaria** (p. 63)
- 55a. Upper glume acuminate and lower lemma shortly awned, or both awned; spikelets in 3-4 rows densely arranged on one side of flattened branches (racemes), or crowded in the upper part of the panicle; fertile lemma minutely mucronate.
55. **Echinochloa** (p. 64)
- 54a. Spikelets pedicellate in open panicles.
58. Lower lemma similar to upper glume and commonly empty (i.e. without stamens); fertile lemma hardened, its margins closely inrolled over the margin of the palea.
56. **Panicum** (p. 64)
- 58a. Both lemmas hardened, the margins incurved on the loose paleas, lower lemma with stamens.
57. **Isachne** (p. 66)
- 53a. Spikelets surrounded by an involucre of rough bristles, or by stiff scabrid or plumose bristles.
59. Bristles persistent after the spikelets fall, one or many per spikelet; spikelets similar to those in **Panicum**.
58. **Setaria** (p. 66)
- 59a. Bristles falling with the spikelets and leaving the rachis bare.
60. Bristles soft and numerous, much longer than the slender spikelets.
59. **Pennisetum** (p. 68)
- 60a. Bristles short and stiff, more or less fused into a hard involucre which tightly encloses the spikelets.
60. **Cenchrus** (p. 70)
- 52a. Glumes stiffer than the membranous lemmas, as long as or longer than the lemmas; spikelets commonly paired, or in triplets with one sessile (fertile) and one or two pedicellate (sterile). (Tribe: **ANDROPOGONEAE**.)
61. Spikelets awnless.
62. Panicle cylindrical, soft and silky with numerous fine white hairs obscuring the spikelets; purple anthers often conspicuous among the hairs.
61. **Imperata** (p. 70)
- 62a. Panicle a narrow spike about 2 mm. diameter, with glabrous spikelets partially sunken into hollows of the jointed rachis; glumes sometimes developing hooked apices.
62. **Hemarthria** (p. 70)
- 61a. Spikelets awned (or at least the fertile ones); panicle open, digitate, or with paired racemes, or the spikelets clustered between leafy or glumaceous bracts; lemmas of fertile spikelets with slender twisted awns.
63. Spikelets in dense bracteate clusters, or in paired racemes on slender peduncles subtended by bracts along a leafy culm.
64. Spikelets in clusters each of which consists of 4 sessile empty spikelets with a triplet

between them; each cluster, and cluster of clusters, subtended by dry or leafy bracts.

63. *Themeda* (p. 70)

64a. Spikelets in paired divergent (finally reflexed) racemes developed on peduncles from the axils of bracts along a leafy culm which forms a long slender panicle.

64. *Cymbopogon* (p. 72)

63a. Spikelets not bracteate, if in paired racemes then these never reflexed.

65. Panicle of 2 or 3 digitate or subdigitate racemes on a slender peduncle; spikelets pale green or purplish, fertile ones without a sharp callus at the base.

66. Joints of the rhachis with a thin translucent line up the centre between thick margins; upper glume glabrous or hairy, sometimes with a conspicuous pit in the upper half.

65. *Bothriochloa* (p. 72)

66a. Joints of the rhachis without a translucent line of thin tissue, slender but rigid; upper glume villous and with a subapical arc of fine spreading hairs.

66. *Dichanthium* (p. 72)

65a. Panicle loose and open; sessile fertile spikelets with brown velvety hairs, a sharp callus at base, those along the branches each with one pedicellate sterile spikelet alongside but the apical one between two pedicellate sterile spikelets.

67. *Sorghum* (p. 72)

Tribe: Arundineae

1. PHRAGMITES Adans. See Clayton (1967, 1968)

Robust perennial with rigid erect stems to 120 cm. high; leaf blades lanceolate, 2-3 cm. wide, midrib prominent below, apices hairlike; panicle ovoid, lower joints bare with whorls or half whorls of silky hairs; spikelets numerous on filiform pedicels, 3-7-flowered, gaping; glumes narrow lanceolate acuminate, 3-5-nerved, glabrous, brownish, lower 4-6 mm. upper 8-10 mm. long; rhachilla with long silky hairs; lemmas linear-acuminate, glabrous, 13-15 mm. long, 3-nerved; paleas shorter than their lemmas. Along banks of rivers and creeks or in swamps or where planted for soil erosion. Cosmopolitan. 'Common Reed'. Fig. 10.

P. australis (Cav.) Trin. ex Steud.
subsp. *australis*

Tribe: Festuceae

2. BRIZA L.

1. Slender glabrous annual; panicle nodding with few large spikelets, pedicels filiform; spikelets 1.5-2 cm. long; glumes concave-orbicular, brown or purple; lemmas pale, clasping at base, palea small, deep-set in base of lemma. In shaded grassy habitats. A Mediterranean species naturalised in all parts of temperate Australia. 'Quaking Grass', 'Blowfly Grass'. Fig. 11.

1. **B. maxima* L.

1a. Tufted or slender glabrous annual; panicles pyramidal; spikelets 3-5 mm. long, numerous and nodding on filiform pedicels; glumes green, concave-orbicular; lemmas green with pale apices. Common weed of shaded wooded areas; European species naturalised throughout temperate Australia. 'Shivery Grass'.

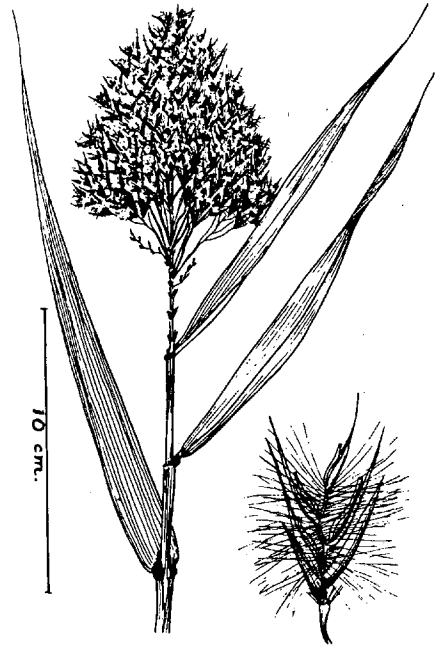
2. **B. minor* L.

3. CYNOSURUS L.

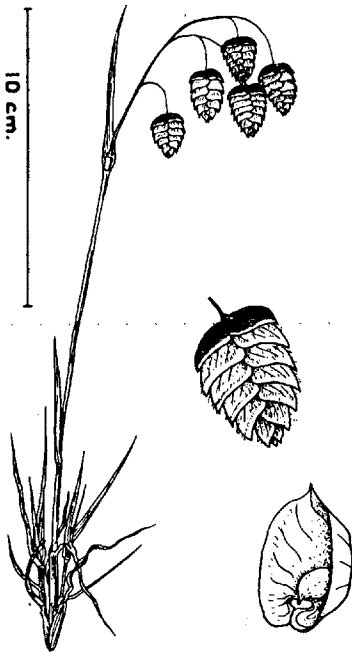
1. Perennial, culms erect, leaves glabrous; panicle a narrow spike to 10 cm. long, less than 1 cm. in diameter; spikelets in neatly seriate clusters when viewed from back; sterile spikelets with strongly keeled glumes and empty lemmas; fertile spikelets 4-6 mm. long, hidden by



9. *Vallisneria spiralis*



10. *Phragmites australis*



11. *Briza maxima*



12. *Cynosurus cristatus*

sterile ones, glumes acuminate, lemmas obtuse, usually shortly awned. Occasional weed of waste or cultivated ground. Native of Europe and western Asia, naturalised in temperate Australia. 'Crested Dog's-tail'. Fig. 12.

1. **C. cristatus* L.

1a. Annual, culms erect or ascendent, leaves glabrous; *panicle ovoid, to 6 cm. long, more than 1 cm. diameter; spikelets not in seriate clusters*; sterile spikelets reduced to shortly awned glumes; lemmas of fertile spikelets *with conspicuous scabrid awns*. Occasional weed of roadsides and waste ground; distribution as for preceding. 'Rough Dog's-tail'.

2. **C. echinatus* L.

4. GLYCERIA R.Br.

Loosely tufted perennial, leaves glabrous or minutely scabrid; panicle open or nodding; spikelets pedicellate, to 2.5 cm. long, linear; lower glume 2-3 mm. long, upper twice as long; lemmas 8-12, 4.8-5.8 mm. long, striate with 7 prominent nerves not reaching the membranous and obtuse or ragged apex; anthers yellow, 1 mm. long; caryopsis 2.6-2.8 × 1.2 mm. Occasional on margins of Lake Burley Griffin near Duntroon and Yarralumla. Closest to *G. declinata* though more robust and larger in all its parts. 'Sweet Grass'. Fig. 13.

**G. declinata* Bréb.

5. PUCCINELLIA Parl.

Apparently annual, densely tufted, leaves glabrous and setaceous; panicle to 30 cm. long; spikelets racemose, shortly pedicellate; glumes narrow acuminate, lower 1-nerved, about 1 mm. long, upper 3-nerved, to twice as long; lemmas 5-6, oblong obtuse, 2 mm. long, glabrous or obscurely scabrid, apices pale and thin; paleas as long as their lemmas. Swampy saline ground in Gungahlin-Lyneham area. Introduced? Fig. 14.

**P. sp.*

6. FESTUCA L. *See Vickery (1939)*

1. Callus at base of lemma bearing a tuft of hairs; rhachilla segments villous.

2. Densely tufted perennial, *leaves flat or folded, 2-5 mm. wide*; panicle open, somewhat nodding; spikelets 4-5-flowered, pedicellate on filiform branches; glumes 5.5-7 mm. long, linear-lanceolate, scabrid on keels, margins scarios, lower shorter and narrower than upper; rhachilla with silky hairs; lemmas scabrid, lowest 8 mm. long with terminal awn 0.5-3 mm. long or apex bifid with awn in notch; palea about as long as its lemma. Swampy ground at high elevations, e.g. Upper Gudgenby, Upper Cotter, Mt Gingera; also eastern New South Wales, high elevations in Victoria and northern Tasmania. 'Hooker's Fescue'.

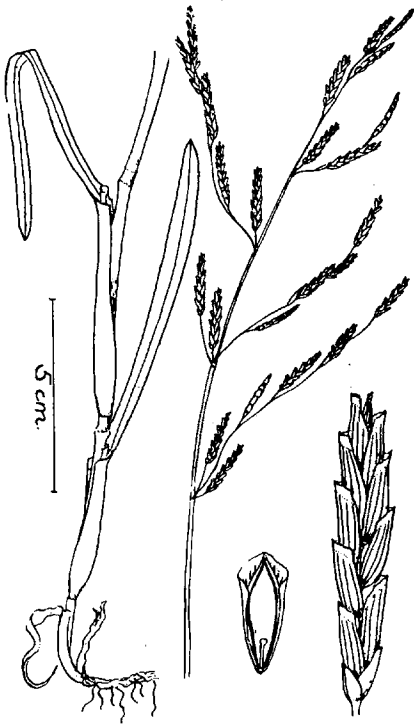
1. *F. hookerana* F. Muell. ex J. D. Hook.

2a. Densely tufted perennial, *leaves long and slender, convolute, scabrid, 0.5 mm. diameter*; plant butt deep-set in soil and surrounded by old leaf bases; *panicle often solitary*, branches lax, bare at base, spikelets 3-5-flowered, pedicellate, 10-13 mm. long; glumes acute, margins scarios, keels scabrid; *rhachilla segments villous on one side*; lemmas lanceolate or elliptical, slightly hardened, green with scarios bifid apex with minute awn in notch; palea about as long. Common in forest of upper mountain slopes (3000-5000 ft); from New England region of New South Wales to East Gippsland, Victoria. 'Snow Fescue', 'Lanky Fescue'. Fig. 15.

2. *F. eriopoda* J. Vickery

1a. Callus glabrous; rhachilla joints scabrid.

3. Coarse often tussocky perennial, *leaf blades 3-5 mm. wide, very scabrid*, inrolled and striate; panicle loose, nodding to one side; spikelets 4-6 flowered, 12-15 mm. long; *glumes lanceolate, 7-8 mm. long*; lemmas golden when young, purplish-brown when mature, 8-10 mm. long, lanceolate, acute or acuminate, *unawned*, scabrid. Forested areas above 4000 ft,



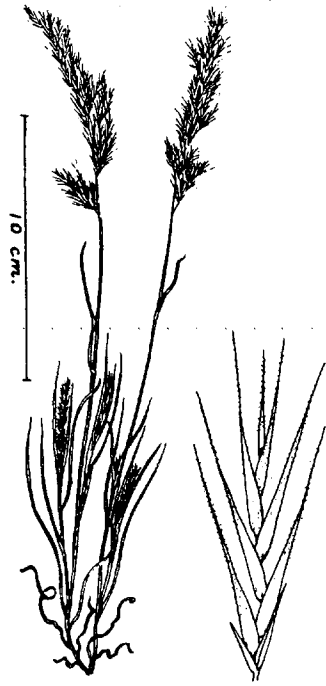
13. *Glyceria declinata*



14. *Puccinellia* sp.



15. *Festuca eriopoda*



16. *Vulpia bromoides*

e.g. Mt Franklin, Mt Gingera, Mt Bimberi, Mt Tidbinbilla; also eastern New South Wales as far north as Barrington Tops and high elevations in eastern Victoria. 'Alpine Fescue'.

3. *F. muelleri* J. Vickery

3a. Similar to *F. eriopoda* but less densely tufted, blades slender, inrolled, scabrid; panicles open; spikelets few, 4-8-flowered, greenish or pale; glumes unequal, *lower 3-5 mm. upper 5-7 mm. long*; lemmas 6-9 mm. long scabrid, *terminal awn 1-4 mm. long*. Sclerophyll forest of intermediate altitudes and also at high levels; from New England region of New South Wales to eastern Victoria. 'Lesser Snow Fescue', 'Graceful Fescue'.

4. *F. asperula* J. Vickery

Note: The introduced species, *F. ovina* L. ('Sheep's Fescue'), may be found occasionally as a contaminant in lawns. The most common lawn species is *F. rubra* L. var. *commutata* Gaudin ('Chewings Fescue'). Another species, *F. arundinacea* Schreb. ('Tall Fescue'), has been planted in local pastures with White Clover and is found occasionally around Black Mountain.

7. *VULPIA* C. C. Gmel.

1. Slender tufted annual, sometimes reduced to single culm, leaves setaceous; panicles narrow, 5-8 cm. long or reduced to 1 or 2 spikelets; spikelets turned to one side, 4-6 flowered; glumes narrow acuminate, *lower 2-4 mm. long, upper twice as long*; lemmas narrow elliptical narrowed above the 6-8 mm. base to a scabrid awn 8-10 mm. long. Native of Europe and the Mediterranean, widely naturalised in Australia and a common weed. 'Silvery Grass', 'Squirrel-tail Fescue'. Fig. 16.

1. **V. bromoides* (L.) S. F. Gray

1a. Lower glume less than $\frac{1}{2}$ as long as upper, often minute.

2. Similar to preceding but panicles nodding and barely exerted from uppermost sheath; *lemmas scabrid but not ciliate*. Common weed with distribution as for above. 'Rat's-tail Fescue'.

2. **V. myuros* (L.) C. C. Gmel.

2a. Habit as in preceding; *lemmas ciliate on upper margins*. Native of Pacific coasts of America, less widely naturalised than two preceding species but not uncommon in the A.C.T. 'Foxtail Fescue'.

3. **V. megalura* (Nutt.) Rydb.

8. *LOLIUM* L.

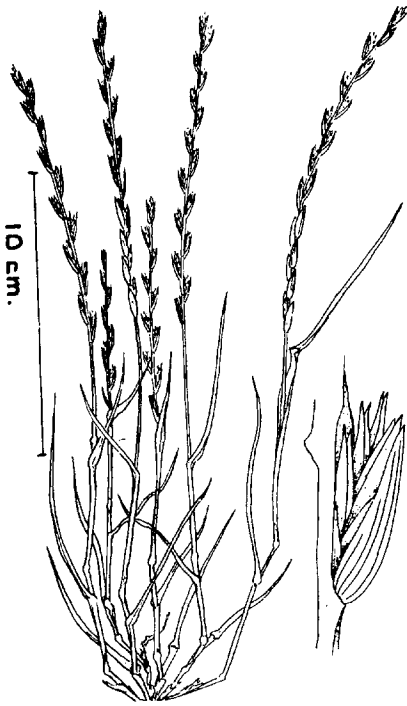
1. Annual or sometimes overwintering; the young leaves rolled (convolute) in the young shoot.

2. *Basal parts purplish, nodes purple*; leaves glossy; panicle a narrow spike, spikelets sessile, biseriate, slightly sunken, laterally compressed; glume against rachis suppressed except on apical spikelet; exposed glume often almost as long as spikelet (at least on young spikes); lemmas lanceolate obtuse, *unawned*. Widely naturalised Mediterranean species, a weed of waste and cultivated areas, contaminant in lawns but also an important pasture grass in rotation with cereals in some parts of Australia and Tasmania. 'Wimmera Rye-grass'. Fig. 17.

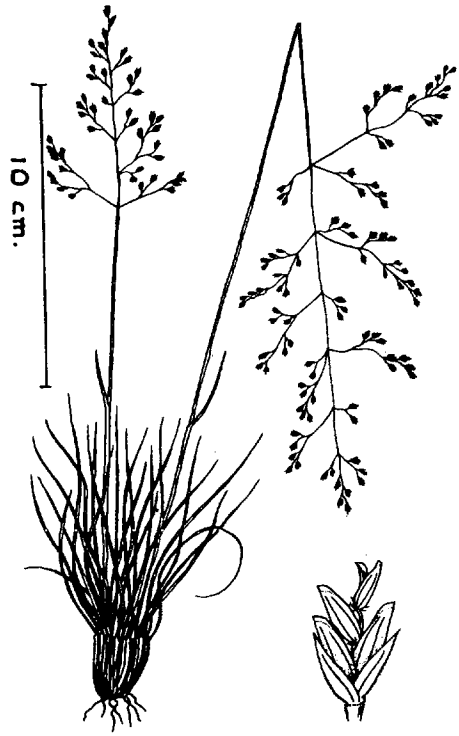
1. **L. rigidum* Gaudin

2a. Taller and more robust than above, *rarely purplish on lower parts*; panicle similar; exposed glume shorter than spikelets; *lemmas awned*, awns as long as or longer than body. Of similar origin to above, sometimes found in rye-grass pastures or as lawn contaminant, possibly not truly naturalised in the A.C.T. 'Italian Rye-grass'.

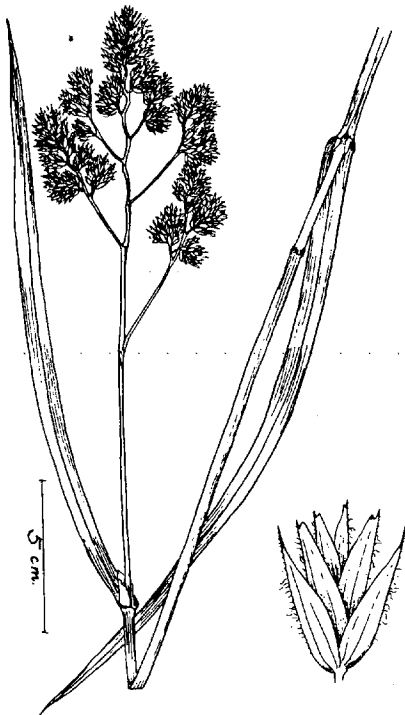
2. **L. multiflorum* Lam.



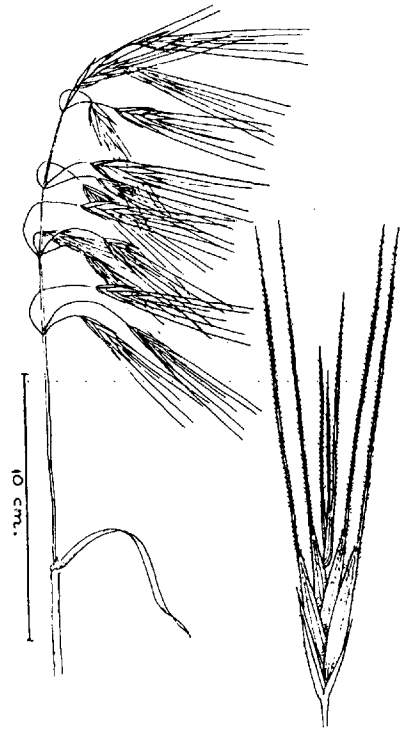
17. *Lolium rigidum*



18. *Poa sieberana*



19. *Dactylis glomerata*



20. *Bromus diandrus*

1a. *Perennial*; leaf blades conduplicate in young shoots; panicle as in above; *lemmas unawned*. Of Euro-Asian origin, now an important pasture species in many countries including temperate Australia, sometimes used in lawns. 'Perennial Rye-grass'.

3. **L. perenne* L.

9. POA L.

Native species:

In the past many specimens of native *Poa* spp. have been placed under *P. caespitosa* Forst., a name which should not be applied to Australian plants. The material of these species is being critically revised and, while it is evident that there may be eight or nine native species occurring in the A.C.T., it is not possible to provide a key or even a list of names. Some of the taxa have not yet been described or named but, since *Poa* spp. are important ecologically, the following notes may serve to indicate the present position.

The native species fall into two groups, those in the first having very slender or filiform, inrolled-terete leaf blades which are commonly grey-green, the other having coarser leaves with flat, conduplicate or inrolled blades which are rarely grey-green.

Group 1

(a) *P. labillardieri* Steud. Large tussocks found in low-lying areas of valleys, or along creek and river banks, especially at low and intermediate altitudes. Leaf blades usually very long and slender; glumes lanceolate-acuminate, about 3 mm. long; lemmas 3-5 mm. long. 'Tussock' or 'Snow Grass'.

(b) *P. sieberana* Spreng. Tufted or tussocky plants, usually with leaves much shorter than the flowering culms with their panicles, usually found in forested habitats or at higher altitudes. Leaf blades grey-green or green, sometimes hairy; glumes ovate, acute-acuminate, about 2 mm. long; lemmas 2-3 mm. long. 'Snow Grass'. Fig. 18.

(c) Possibly three undescribed species but none as common as (a) and (b) and two possibly restricted to high elevations.

Group 2

(d) *Poa* sp. A. Plants forming large tussocks, culms with spreading panicles and up to 1 metre or more high, culm leaves well-developed; blades flat (fresh or dry), striate, highly scabrid on upper and less so on lower surface; glumes 2 mm. long; lemmas 3 mm. Common along creek margins in mountain gullies, especially above 3000 ft, also in mountain swamps.

(e) *Poa* sp. B. Coarse tussocky grass, culms less robust than in A; culm leaves with reduced blades, lower leaf sheaths often purplish, blades commonly long and inrolled-terete, increasingly scabrid towards slender apex; panicle sometimes long; glumes 3-3.5 mm. long; lemmas 4-4.5 mm. Found in similar sites to preceding but possibly less common.

(f) *P. saxicola* R. Br. Short tussocky grass, older leaf sheaths often dark brown, blades conduplicate or lower part open, scabrid on upper but smooth on lower (exposed) surface except at obtuse hooded apex; panicle narrow, spikelets not numerous; glumes broadly elliptical, obtuse-acute, 4-5 mm. long; lemmas about as long but with narrow acute-mucronate apices. Found at high elevations, in swampy flats with or without low shrubs.

Naturalised Species:

1. Plants without rhizomes.

2. *Annual* or short-lived perennial; leaves light green, ligule membranous, 2-3 mm. long; panicle open, branches spreading; spikelets towards the ends of branches, 3-4-flowered, 4-5 mm. long; glumes unequal, lower 1-nerved, upper 3-nerved; lemmas 3 mm. long, 5-nerved with pale margins, *sparsely silky but lacking basal tuft of webby hairs*. A cosmopolitan species widely naturalised in temperate Australia. 'Winter Grass'.

1. **P. annua* L.

2a. Perennial. Lemmas with webby hairs at base.

3. *Bases of culms bulbous, leaves glabrous*, ligule to 4 mm. long; panicle ovate, spikelets clustered, shortly pedicellate, 3-6-flowered, 3-6 mm. long; *sometimes modified into miniature plants*; glumes boat-shaped, membranous, scabrid on keels and marginal nerve; lemmas broadly lanceolate, hairy on keels and margins. Native to temperate areas of Europe, Asia, and North Africa, common in parks, ovals, and waste areas in Canberra. 'Bulbous Poa'.

2. **P. bulbosa* L.

3a. *Bases of culms not bulbous*, loosely tufted, *leaves scabrid*, ligule 4-10 mm. long; panicle ovate or oblong, branches 3 or more per node; spikelets clustered towards ends of branches, 3-4 mm. long, 2-4-flowered; glumes thin, midribs scarious; lemmas shortly hairy on keel and with *basal tuft* of fine webby hairs. Possibly only occurring locally as contaminant in lawns. A native of northern temperate regions. 'Rough Meadow Grass'.

3. **P. trivialis* L.

1a. *Plants rhizomatous, perennial*, leaves smooth, ligule up to 3 mm. long on upper leaves; panicle pyramidal or ovate, open when mature, branches bare at their bases; spikelets 2-5-flowered, 4-6 mm. long; glumes equal, keels scabrid; lemmas 3-4 mm. long, hairy on keel and lower parts of marginal nerves and with basal tuft of webby hairs. Native of Europe and Asia, introduced to North America and elsewhere. Commonly used as lawn grass in Canberra but not yet widely naturalised locally. 'Kentucky Blue-grass', 'Meadow Grass'.

4. **P. pratensis* L.

10. DACTYLIS L.

Tufted perennial to 60 cm. high, densely tussocky, shoots flattened, leaves glabrous or minutely scabridulous, light or fresh green, ligule membranous with ragged margin; panicle with spreading branches bare at their bases; spikelets laterally compressed and densely packed in 1-sided clusters at the ends of branches, 2-5-flowered, 5-7 mm. long; glumes scabrid or ciliate on keel, 3-nerved with terminal mucro, 4-6.5 mm. long; lemmas closely imbricate, scabrid-ciliate on keel and with mucro at notched or entire apex. Pasture grass native to temperate regions of the Old World, naturalised in many areas of temperate Australia. Sometimes occurs as a contaminant in Canberra lawns, occasionally naturalised. 'Cocksfoot'. Fig. 19.

**D. glomerata* L.

11. BROMUS L.

Note: The genus *Bromus* is a large one which may include more than 100 species. While the author agrees with those who consider it should be subdivided into several genera a majority of current treatments in the countries of origin and in Australia retain all species in the one genus pending an authoritative study of the whole series. For the sake of consistency this practice has been followed here though in Burbidge: *Australian Grasses*, vol. 1 the names *Ceratochloa* and *Serrafalcus* were used.

1. Upper lemmas divaricate and with conspicuous terminal awn; glumes 1-3-nerved. Annuals.

2. Few-stemmed plants to 40 cm. high, *culms pubescent below the panicle*, leaves villous, turning purple or reddish when old, ligule membranous; panicle compact, the shortly pedicellate spikelets partially obscured by purplish awns; lower glume 6-8 mm. long, purplish and hairy, upper 11-14 mm. long, 3-nerved, broader than lower; lemmas narrow lanceolate passing into scabrid awns arising from between minute scarious lobes. Of Mediterranean origin but now naturalised in many parts of temperate Australia though uncommon in the A.C.T. 'Red Brome'.

1. **B. rubens* L.

2a. Culms glabrous below the panicle.

3. Tufted plants to 40 cm. high, leaves glabrous or pubescent; panicle loose, more or less erect; spikelets erect or spreading, shortly pedicellate, 7-15-flowered; glumes acuminate, lower 7-9 mm. long, 1-nerved, upper 12-15 mm. long, 3-nerved; rachilla joints glabrous or pubescent below calli of lemmas; lemmas 15-18 mm. long (excluding awns), more or less scabrid-pubescent, awn scabrid. Of Mediterranean origin, now widely naturalised throughout temperate Australia, on waste or cultivated areas and in natural pastures. Less common in the A.C.T. than **B. diandrus**. 'Lesser Brome'.

2. ***B. madritensis** L.

3a. Tufted plants to 60 cm. high, leaves hirsute-villous; panicle loose, nodding to one side with pedicellate spikelets pendant; spikelets 5-10-flowered, 6-10 cm. long (including awns); glumes turning purplish with age, lower 15-25 mm. long, upper 20-30 mm. long; lemmas rigid, scabrid with prominent nerves, 20-25 mm. long (excluding long scabrid awns). Of Mediterranean origin, naturalised throughout temperate Australia and a common local weed on waste or cultivated areas. 'Brome Grass'. Fig. 20.

3. ***B. diandrus** Roth

1a. Upper lemmas not or scarcely divaricate; glumes 5-9 nerved.

4. Densely tufted perennial or biennial, lower sheaths densely villous and ciliate, upper scabrid or glabrous like the blades, ligule membranous and ragged; panicles 15-25 cm. long, spikelets pedicellate and nodding, 25-35 mm. long, strongly laterally compressed, oblong to lanceolate; glumes glabrous, keeled, subequal, 12-16 mm. long, lower 7-nerved, upper 9-nerved; lemmas closely imbricate at first, broadly ovate-lanceolate, acuminate, 18-22 mm. long with short scabrid awn arising slightly below scarious apex. The hardened keeled glumes and lemmas in flattened spikelets indicate placement in *Ceratochloa*, a section of **Bromus** regarded by some as generically distinct. South American species introduced as a pasture grass, now a common weed in many parts of temperate Australia. 'Prairie Grass'. Fig. 21.

4. ***B. unioides** H.B.K.

4a. Villous or pubescent annuals; panicles erect, spikelets shortly pedicellate and loosely compact, not or only slightly compressed; glumes and lemmas rounded on the back, awned from below notched apex.

5. Tufted softly villous plants to 50 cm. high; culms usually pubescent below the panicles; spikelets 8-14-flowered; glumes concave, obtuse or acute, subequal, 5-7-nerved; lemmas oblanceolate, in side view shortly narrowed to apex, 7-nerved, villous especially towards apex but hairs often more or less appressed and sufficiently sparse to reveal minutely papillose epidermis, apex bifid; scabrid awn at least twice as long as its lemma. Introduced from Europe and now widely naturalised throughout temperate Australia. A common weed in grassy places, gardens, and natural pastures but easily confused with the following species. 'Soft Brome'. Fig. 22.

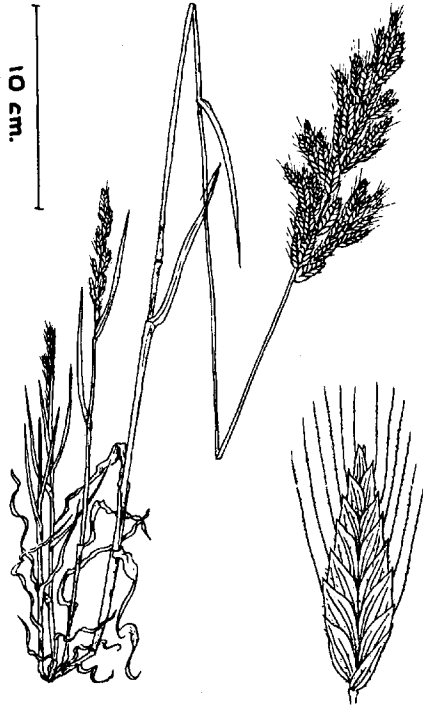
5. ***B. mollis** L.

5a. Resembling **B. mollis** but with lower leaves villous and upper ones pubescent or more or less glabrous; culm glabrous below the panicle which is similar to that of **B. mollis**; lemmas narrower and slightly smaller (6.5-7.5 compared to 7-8.5 mm.), elliptical so that in side view there is a gradual narrowing to apex, villous with spreading hairs often sufficiently numerous to obscure surface below; awn sometimes spirally twisted for a complete turn and more or less divaricate. Of Mediterranean origin, the distribution in Australia uncertain due to confusion with **B. mollis**. One or both are used in pastures with subterranean clover (*Trifolium subterraneum*). 'Soft Brome'.

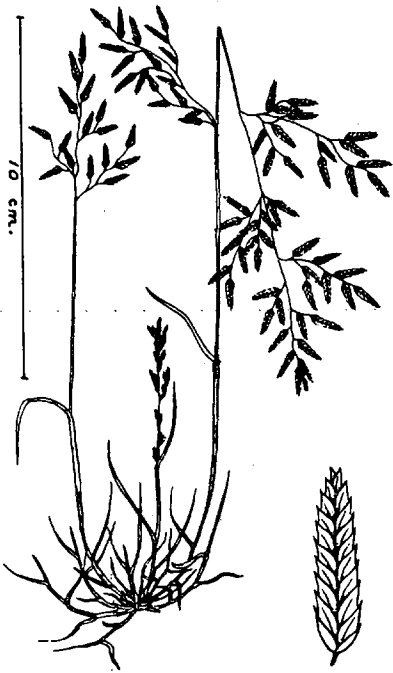
6. ***B. molliformis** Lloyd



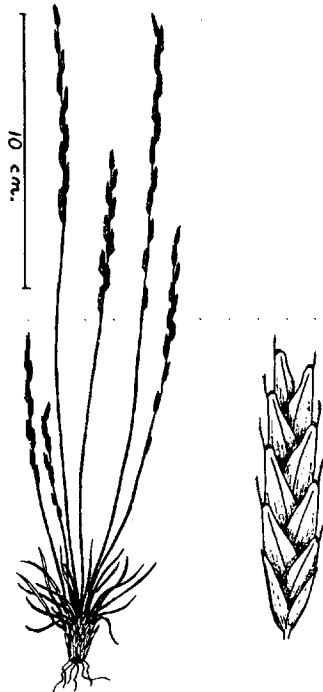
21. *Bromus unioloides*



22. *Bromus mollis*



23. *Eragrostis benthamii*



24. *Tripogon loliiformis*

Tribe: Eragrosteae

12. ERAGROSTIS Beauv.

1. Leaves glandular at least on the main nerves towards the base of the sheaths or along the midnerve and sometimes with a ring of glands on the culm below the nodes. Introduced annuals.

2. Tufted annual, *sheaths with pitted glands along the larger nerves* and always hairy at the orifices; panicle erect, loose, with very numerous dark grey spikelets on stiff spreading branches; *spikelets 6-10-flowered, 1.5-2 mm. broad*, ovate oblong or linear when older; *lemmas loosely overlapping*, with inconspicuous lateral nerves close to the margins. Native to southern United States, Mexico, and South America. Naturalised in Canberra area, locally common in some places during summer.

1. **E. neomexicana* Vasey

2a. Tufted annual, *leaves with pitted glands along midnerves (sheaths and blades) and raised thickenings along margins*, sometimes with ring of pitted glands on culms below nodes; panicle becoming pyramidal; *spikelets 12-30-flowered, 4-5 mm. broad*, shortly pedicellate, lanceolate to linear-lanceolate or oblong, 8-15 mm. long; *lemmas neatly biseriate, lateral nerves conspicuous*, lead-grey, keeled by midrib which may bear tuberculate glands. A summer weed sometimes with unpleasant odour, not uncommon in gardens and on waste areas. Of Mediterranean origin but widely naturalised throughout temperate Australia. 'Stink Grass'.

2. **E. cilianensis* (All.) Link ex Vign.-Lut.

1a. Leaves and culms not glandular. Native species (except *E. chloromelas*).

3. Annuals; lemmas loosely arranged or overlapping basally and without a central furrow up the spikelet.

4. Slender glabrous annual to 40 cm. high, leaves mostly in basal tuft, sheaths loose; panicle very open, *stiffly and erectly spreading*; *spikelets oblong to ovate, 4-5 mm. long, 2-5-flowered*, lead coloured, on filiform pedicels; lemmas with inconspicuous lateral nerves. In grassland or woodland on plains and lower mountain slopes. Scattered distribution from Queensland to eastern Victoria.

3. *E. trachycarpa* (Benth.) Domin

4a. Slender glabrous annual to 40 cm. high, leaves mostly basal but uppermost sheathing the commonly drooping *lax panicle* which is 20-30 cm. long with filiform branchlets; spikelets on pedicels to 1 cm. long, *narrow linear, 8-9 mm. long, 8-12-flowered*, less than 2 mm. broad, lead-grey in colour. Widespread in southern and eastern Australia. 'Weeping Love Grass'.

4. *E. parviflora* (R.Br.) Trin.

3a. Perennials.

5. Densely tufted, *culms to 70 cm. high*, leaf blades with fine hair tips that coil when old; panicle to 30 cm. long, spreading when older; *spikelets linear, 4-6-flowered, 4-5 mm. long, 1 mm. wide*, lead-grey; lemmas loosely arranged but overlapping along rhachilla, lateral nerves obscure. The plants resemble some forms of *E. curvula* (Schrad.) Nees in which the

spikelets are loosely adpressed to the panicle branches and the leaves are less frequently coiled at the tips. Of South African origin but has been collected in Uriarra area.

5. **E. chloromelas* Steud.

5a. *Plants tufted with spreading culms and ascendant or erect panicles; spikelets on slender but stiff spreading branches, elliptical, 8-14-flowered, 4-8 mm. long, 1.5-2 mm. wide, furrowed between the distichous lemmas, lead-grey or purplish. Common in native pastures especially on shallow soils and stony slopes along the river valleys. On advice from Dr S. T. Blake of Brisbane, the name E. brownii (Kunth) Nees ex Steud. is no longer being used for A.C.T. material. Fig. 23.*

6. *E. benthamii* Mattei

13. **TRIPOGON** Roem. et Schult.

Small tufted perennial, leaves in a short basal tuft, blades often less than 5 cm. long, sparsely villous, conduplicate-inrolled; panicle narrow with adpressed spikelets alternate and biseriate; spikelets linear, 4-9 mm. long, 1.5-2 mm. wide, sessile, slightly sunken in the flattened rhachis, glumes scarious, 1-nerved, lower (against rhachis) sometimes reduced; lemmas ovate, 3-nerved, lateral nerves not reaching lateral lobes, central nerve continued as mucro 0.5-1 mm. long. This species has two forms, only one of which occurs in the A.C.T. The other is more common in dry inland districts and has a contracted spike with the spikelets much overlapped and twisted to one side of the rhachis. 'Five Minute Grass'. Fig. 24.

T. loliiformis (F. Muell.)

C. E. Hubbard

14. **ELEUSINE** Gaertn.

1. Tufted *perennial* with glabrous stems and leaves, blades conduplicate; panicle on slender culm to 25 cm. high, digitate with 2-3 *very compact branches less than 3 cm. long; spikelets ovate or oblong, 5-7-flowered, plump when mature* but flattened laterally; glumes shorter than lemmas; lemmas keeled, nerves green and mostly crowded near keel, apices blunt and slightly incurved, lateral nerves sometimes short. Regarded as of American origin but naturalised in many countries including eastern Australia. In the A.C.T. an uncommon short-lived summer weed. 'Goose Grass'. Fig. 25.

1. **E. tristachya* (Lam.) Lam.

1a. Ascendant *annual*, with few tubercle-based hairs on upper parts of sheaths and bases of blades, culms flattened, blades conduplicate; panicle digitate or subdigitate with 1-2 spikes below terminal group; *spikes 4-10 cm. long, 2-8 in number; spikelets lanceolate, 3-5-flowered, flattened; glumes shorter than lemmas, oblong lanceolate, keeled; lemmas lanceolate, keeled, 3-4 mm. long, not incurved. Widespread in tropical regions, a weed of cultivated areas or waste ground in eastern Australia but a rare garden weed in Canberra. 'Crowsfoot Grass'.*

2. **E. indica* (L.) Gaertn.

Tribe: **Aveneae**

15. **HOLCUS** L.

Softly villous perennial to 60 cm. high, leaves with truncate membranous ligules and flat blades; panicle ovoid or lanceolate, loosely compact, interrupted, 6-15 cm. long; spikelets oblong, laterally flattened, 2-flowered; glumes equal, 4-5 mm. long and milky-white tinged with pink or red, villous ciliate on the keels and pubescent laterally; lower glume 1-nerved, upper 3-nerved; lemmas shorter than glumes, lower fertile, upper with stamens only but commonly with an awn which curves as it dries. Native of temperate areas of Europe and

Asia but now widely naturalised in many countries including cool temperate areas of all Australian States. Common in the A.C.T. especially in roadside ditches, on banks of creeks and near swamps at all altitudes. 'Yorkshire Fog'. Fig. 26.

**H. lanatus* L.

16. *LOPHOCHLOA* Reichenb.

Few-stemmed annual with dense cylindroid or ovoid panicles; leaves flaccid, lower sheaths villous, upper sparsely so, blades sparsely villous especially on upper surface; spikelets shortly pedicellate, flattened laterally, 3-4 mm. long, 4-6-flowered; glumes lanceolate, acuminate or acute, scabrid-hairy on keels; lemmas little longer than glumes, 5-nerved and shortly hirsute with stiff hairs, shortly awned in apical notch, paleas bifid. Weed in waste or cultivated ground. Formerly *Koeleria phleoides* (Vill.) Pers. (= *K. gerardii* (Vill.) Shinnery) transferred to *Lophochloa* by Reichenbach but according to Shinnery (1956) the epithet 'phleoides' should be rejected. Of Mediterranean origin but now widely naturalised and to be found throughout temperate Australia. 'Annual Cat's-tail Grass'. Fig. 27.

**L. cristata* (L.) Hylander

17. *KOELERIA* Pers.

Slender few-stemmed perennial up to 50 cm. high, leaves hairy and ciliate on the margins, upper blades reduced in size; panicles linear-oblong, 6-12 cm. long, 1.5-2 mm. diameter, sometimes interrupted near base, branches pubescent; spikelets sessile, laterally compressed, 3-4-flowered, 5-7 mm. long, pale or purplish where the stamens show through membranous tissue; glumes oblong, scarious, strongly keeled by the scabrid midrib; lower glume 1-nerved and 3.5-4 mm. long, upper 3-nerved and 4.5-5 mm. long; lemmas membranous-scarious, 4.5-5 mm. long with minute mucro in the apical notch; palea little shorter, thinly membranous and gaping free. A rare grass which has been collected in alpine woodland on Mt Franklin and Mt Ginini. The true position of this species is not entirely certain. It may be misplaced in *Koeleria*.

K. australiensis Domin

18. *TRisetum* Pers. See *Hulten* (1959)

Slender tufted perennial to 40 cm. high; leaves and culms pubescent, ligule a ciliate membrane, blades striate on upper surface; panicle densely contracted, often interrupted towards the base, 10-14 cm. long; spikelets 3-4-flowered, 6-7 mm. long with conspicuous awns; glumes lanceolate 4-5 mm. long, hairy midrib prominent; lemmas slightly longer than glumes, sparsely hairy, ciliate on margins, notched at apex, with spreading or recurved awn about as long and attached below notch; palea thin. A species with world-wide distribution in alpine and high mountain habitats. Our representative occurs at high elevations in the Kosciusko area, Victoria, and Tasmania; also in New Zealand. Its occurrence in the A.C.T. requires verification. Fig. 28.

T. spicatum (L.) Richter subsp.
australiense Hulten

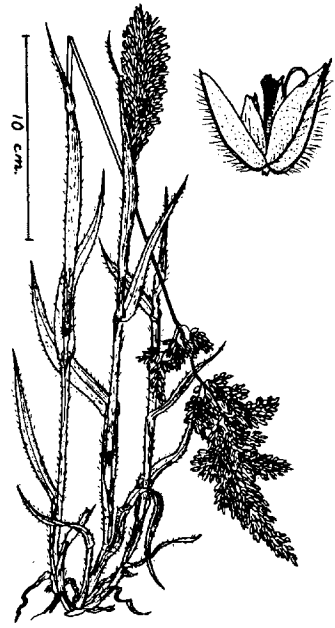
19. *AIRA* L.

1. Delicate annual, leaves glabrous with conspicuous membranous ligule; *panicle very open and lax*; spikelets about 2 mm. long on filiform *pedicels 3-5 times as long*; glumes membranous, ovate acuminate; lemmas shorter and narrower than glumes, hardened, brown and with acuminate bifid apex and a dorsal geniculate awn or 1 lemma smaller and without awn. Mediterranean species common in grassy places. 'Delicate Hair-Grass'. Fig. 29c.

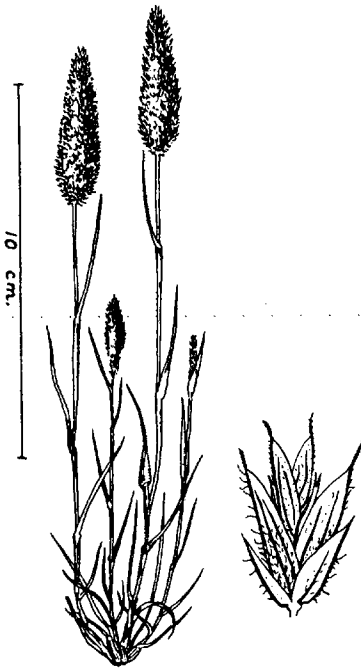
1. **A. elegans* Willd. ex Gaudin



25. *Eleusine tristachya*



26. *Holcus lanatus*



27. *Lophochloa cristata*



28. *Trisetum spicatum*

1a. Panicle open but spikelets clustered towards ends of branches and on pedicels rarely more than twice as long.

2. *Spikelets 1.5-2.5 mm. long*, lemmas glabrous at base or with few short hairs. Otherwise similar to following species. Of Mediterranean origin but widely naturalised, very common in the A.C.T. in grassy places. 'Silvery Hair-Grass'. Fig. 29b.

2. **A. cupaniana* Guss.

2a. *Spikelets 2.5-4 mm. long (usually 3-3.5 mm.)*, lemmas with tuft of hairs at base. A delicate annual like both the above and of similar origin. Naturalised throughout temperate Australia but less common than preceding in the A.C.T. 'Silvery Hair-Grass'. Fig. 29a.

3. **A. caryophyllea* L.

20. DESCHAMPSIA Beauv.

Tufted glabrous perennial, leaves with stiff almost pungent apices when dry; panicle open or loosely contracted especially when young; spikelets loose or gaping, 4-6 mm. long, 2-flowered; glumes lanceolate, longer than lemmas, lower 1-nerved, upper 3-nerved; lemmas membranous, 5-nerved, truncate, awned from villous base, rhachilla villous, the uppermost joint protruding above florets. Widely distributed in cool temperate and alpine areas of the world; occurs at high altitudes in the Australian Alps, eastern Victoria, and Tasmania and, though not yet recorded, possibly present in the A.C.T. 'Tufted Hair-Grass'. Fig. 30.

D. caespitosa (L.) Beauv.

21. ARRHENATHERUM Beauv.

Coarse loosely tufted erect perennial to 1 metre high, roots yellowish, one or more basal internodes bulbous; leaves glabrous or sparsely hairy, ligule membranous, blades flat, to 40 cm. long, 5-8 mm. wide; panicle loose, somewhat contracted when dry, to 30 cm. long; spikelets pedicellate, more or less gaping, usually 2-flowered; glumes shining, minutely scabridulous, lower 1-nerved, 5-6 mm. long, upper 3-nerved, 9-11 mm. long; lemmas about as long as upper glume, 7-nerved, hairy near base, scabrid above; lower one with twisted awn 12-17 mm. long attached below middle, upper awnless or with short bristle attached near apex. Native to Europe and western Asia, naturalised in most temperate areas of the world including temperate Australia and Tasmania, uncommon in the A.C.T. 'Bulbous Oat Grass', 'Onion Couch'. Fig. 31.

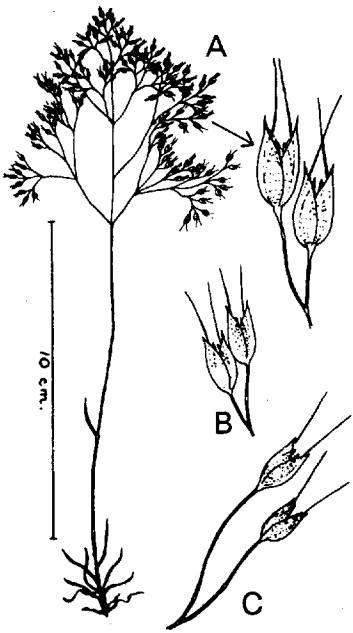
**A. elatius* (L.) J. et C. Presl var.
bulbosum (Willd.) Spenner

22. AMPHIBROMUS Nees. See Morris (1934), Swallen (1931)

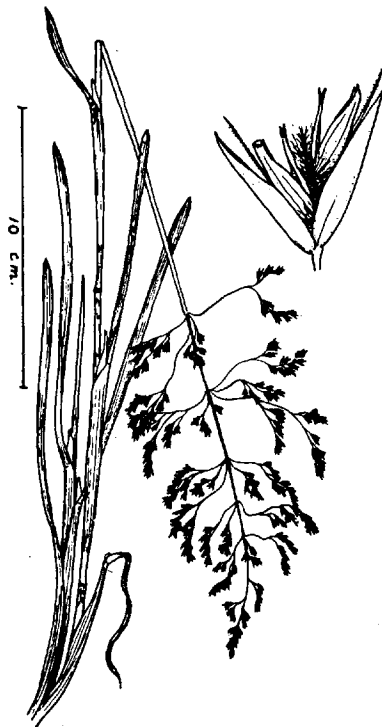
1. Densely tufted perennial, leaves scabrid, ligule membranous, 3-10 mm. long with acuminate or ragged apex; blades flat or involute with *long slender apices*; panicle narrow, 15-30 cm. long, base held in uppermost sheath; spikelets shortly pedicellate along slender branches, 10-15 mm. long (without awns), 4-7-flowered; glumes subequal, 4-5 mm. long, lower 3-nerved, upper 3-5-nerved; lemmas 5-7 mm. long, 7-nerved, *coarsely scabrid on back, nerves not reaching the scabrid denticulate or ragged apex*; callus bearded; awn arising from *middle of back*, 1-2 cm. long, slightly twisted below middle. Forming tussock communities in swampy ground, at low elevations and in valleys, e.g. near Sullivans Creek; widespread in southern and eastern temperate Australia and Tasmania. 'Swamp Wallaby Grass'. Fig. 32.

1. *A. neesii* Steud.

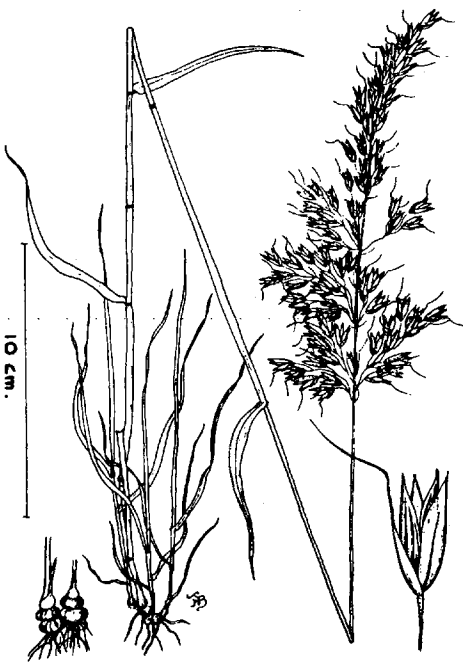
1a. Not densely tufted, weakly rhizomatous, stems bulbous at base, *apices of leaf blades almost pungent-pointed*; panicle slender, to 20 cm. long, with slender branches or subracemose; spikelets 3-4-flowered; lower glume 3-4 mm. long, upper 4-6 mm. long; lowest lemma



29. A. *Aira caryophylla*
 B. *Aira cupaniana*
 C. *Aira elegans*



30. *Deschampsia caespitosa*



31. *Arrhenatherum elatius* var. *bulbosum*



32. *Amphibromus neesii*

6-7 mm. long, of hardened texture, not scabrid though minutely papillose-scabridulous under high magnification, nerves reaching upper margin which is weakly dentate, awn arising from above middle of back, twisted in lower part, the upper section spreading or recurved; all lemmas swollen towards base when mature and with bearded callus at the base. Uncommon, associated with seepage areas in Long Gully Lane, Kambah, and Mt McDonald areas.

2. *A. sp.*

23. *AVENA* L.

1. Lemmas with silky hairs.

2. Tufted annual of robust habit, stems and leaves glabrous; panicle open, nodding to one side; spikelets nodding from filiform pedicels, gaping; glumes broadly lanceolate acuminate, pale with green nerves, subequal, 2-2.5 cm. long, longer than lemmas which are both awned from back and clothed with *pale or white hairs*, apices each with *two short bristles*; awns geniculate, more than twice as long as their lemmas. A Mediterranean species naturalised throughout temperate Australia, a common weed of waste or cultivated ground. 'Bearded Oat'. Fig. 33a.

1. **A. barbata* Pott ex Link

2a. Apices of lemmas split into two scarious lobes or points.

3. Resembling preceding species but leaves sometimes scabridulous; panicle loose with large gaping spikelets; glumes 2.4-2.7 cm. long; lemmas 2-3, 1.8-2 cm. long, hardened, covered with *golden brown silky hairs in lower half*, scabrid above, readily splitting apart, two lower lemmas with an oblique hollow scar at base, third lemma (if present) awned, apices shortly bifid and scarious; awn arising from lower half of back and more than twice as long as its lemma, brown or black below when mature. Native to Europe, the Mediterranean and Asia but a common weed throughout temperate Australia. 'Wild Oat'. Fig. 33b (lemma only).

2. **A. fatua* L.

3a. Annual similar to above but lower leaf sheaths slightly hairy; panicle open with nodding spikelets; glumes broadly lanceolate acuminate, 2.5-3.5 cm. long with slender acuminate apices; lemmas about $\frac{2}{3}$ as long as glumes, becoming hard and brown with brown hairs on lower half, second lemma not readily separating from the hardened rachilla and without a basal scar, third lemma (if present) awnless, apices bifid with small scarious points. The lemmas fall together and remain attached to one another. Native to Europe and Asia and possibly the most common wild oat around the Canberra area, a weed of waste ground or cultivated areas. 'Wild Oat'. Fig. 33c (lemma only).

3. **A. ludoviciana* Durieu

1a. Lemmas glabrous and shortly 2-toothed, awns scarcely twisted and sometimes lacking from upper lemma. Well known crop plant but may be found as an escape growing near stockyards or on fallow ground. 'Oat'.

4. **A. sativa* L.

Tribe: Danthoneiae

24. *DANTHONIA* DC. See Brock and Brown (1961), Vickery (1956)

Note: A number of the Australian species of *Danthonia* has been transferred to a new genus, *Notodanthonia* Zotov (1963). His definition is applicable to species where there are distinct horizontal series of hair tufts on the backs of the lemmas. Since his concept does not apply to a clearly defined group among our species the generic definition may have to be broadened. For the present our species are retained under *Danthonia*. For those which were transferred by Zotov see under *Notodanthonia* in the Index.

1. Body of lemma villous with hairs not or only partially in horizontal series of minute tufts.
2. Tall coarse densely tufted perennial to 120 cm. high, leaves long, inrolled when dry; panicles loose, 15-25 cm. long; spikelets to 2 cm. long, 5-6-flowered; glumes 14-16 mm. long, 5-nerved, lanceolate, acuminate; *lemmas without dense series of hair tufts*, narrow, body (including callus) 5 mm. long, *evenly villous on back*; lateral lobes about as long as body, with soft apices often twined in coils of 10 mm. long central awn; anthers bright orange or red. In shallow soils of dry forest habitats at lower elevations; also New South Wales and Victoria. 'Red-anther Wallaby Grass', 'Silvertop'.

1. *D. pallida* R.Br.

2a. Lemma with upper series of hair tufts longer than those of the body; lower series of long hairs sometimes also present.

3. Short tufted perennial to 20 cm. high, leaves sparsely hirsute or glabrous, ligule ciliate with longer hairs at margins, blades inrolled; *panicle compact, less than 4 cm. long*; spikelets plump, 9-11 mm. long, 3-6-flowered; glumes boat-shaped, green on nervate centre, scarious margins pale or purplish; *lemmas divided to middle into broad acute lobes not longer than body and short not twisted central awn*, body oblong with upper series of hair tufts, villous below, callus blunt; lowest lemma about 5 mm. long (with callus). Common in native pastures, grassland, and woodland; also New South Wales, Victoria, South Australia, and Tasmania. 'Short Wallaby Grass'. Fig. 34a.

2. *D. carphoides* F. Muell.
ex Benth.

3a. Lateral lobes of lemmas longer than body. Panicle more than 4 cm. long, rarely less if racemose and with few loosely arranged spikelets.

4. Body of lemma (with callus) more than 3 mm. long, densely villous all over but with an upper series of longer hairs. Leaves inrolled when dry but not setaceous.

5. Densely tufted perennial to 1 metre high, leaves subglabrous, ligule with longer hairs marginally; panicle finally much exerted, to 10 cm. long, spikelets broadly cuneate when older, 4-6 flowered, *plump*; glumes broadly lanceolate, scarious margins pale or purplish, *shortly narrowed into slender apices barely longer than lemmas*, 10-15 mm. long; lemmas compactly arranged, densely villous on back with longer tufts above, body 4-6 mm. long; lateral lobes slightly longer, narrowed into fine setose points, central awn slightly longer than lobes and recurved or once twisted. Palea broadly obovate. Occasional in native pastures at low elevations; also Queensland, New South Wales, Victoria, and South Australia.

3. *D. richardsonii* A. B. Cashmore

5a. Tufted perennial to 60 cm. high, leaves glabrous except at orifices of sheaths, inrolled when dry; panicle loose or contracted, not always much exerted, 6-12 cm. long; *spikelets slender, 4-6-flowered; glumes with acuminate apices*, 8-14 mm. long; lemmas densely villous on body below upper series of long hairs, callus hairy; lateral lobes about twice as long as body, apices slender setose, central awn slightly longer, recurved at base, scarcely or once to thrice twisted; palea elliptical, hairy on lower back. The variety is distributed widely in central and southern New South Wales and in Victoria. True *D. linkii* is more common in south-eastern Queensland and northern to central New South Wales. 'Wallaby Grass'.

4. *D. linkii* Kunth var. *fulva*
J. Vickery

4a. Body of lemma less than 3 mm. long.

6. Tufted perennial; *leaves to 40 cm. long*, sometimes over-topping panicles, slender and

curved or flexuose in upper part; panicle 5-15 cm. long, base sometimes retained in uppermost sheath; spikelets numerous, 5-6-flowered; glumes narrow acuminate, 8-12 mm. long, 3-5-nerved at base, thin margins conspicuous; *body of lemma densely villous with upper row of hairs almost twice as long as body*; lateral lobes thin, to 7 mm. long; central awn thin, loosely twisted below; palea longer than body of lemma, narrow lanceolate or oblanceolate, villous in lower half. Not common in the A.C.T., grows on rocky slopes in Molonglo Gorge and Ginninderra Gorge (N.S.W.); also south-eastern Queensland, eastern New South Wales, eastern Victoria, and Tasmania.

5. *D. longifolia* R.Br.

6a. Tufted perennial, *leaves mostly less than 15 cm. long*, shortly hirsute, hairs sometimes tuberculate; panicles on slender culms with reduced leaves, loosely ovoid to racemose, spikelets sometimes only 3-4; glumes 8-11 mm. long, 7-9-nerved, margins often purplish; *body of lemma with both upper and lower series of hair tufts and sparsely hairy on the back*, the upper hairs about as long as body; lateral lobes to 3 times as long as body, broad below setose apices, central awn much longer, twisted below; palea obovate, longer than body of lemma, sparsely hairy on lower back. Woodland areas and native pastures; also Dividing Range and associated Tablelands of New South Wales. 'Wallaby Grass'.

6. *D. monticola* J. Vickery

1a. Body of lemma with hair tufts in one or two horizontal series but glabrous and smooth between. (See *D. monticola* above.)

7. Lemmas with well-developed hair tufts below the lobes.

8. Lemmas with dense series of hair tufts across base of lemma above the callus.

9. Shortly tufted perennial, similar in habit to *D. carphoides* and *D. monticola*; panicle short, dense and ovoid, 4-6 cm. long; spikelets 5-8-flowered, gaping; glumes conspicuously longer than lemmas (excluding awns) lemmas with lateral lobes about 3 times as long as body, *outer margins with a projecting tooth or auricle below the slender setae*, central awn longer than lobes, twisted below; palea broadly obovate, hairy on back. Common in open woodland and dry forest habitats; also in New South Wales, Victoria, and South Australia; introduced in New Zealand. 'Lobed Wallaby Grass'. Fig. 34c.

7. *D. auriculata* J. M. Black

9a. Margins of lateral lobes of lemmas passing gradually into the terminal setae.

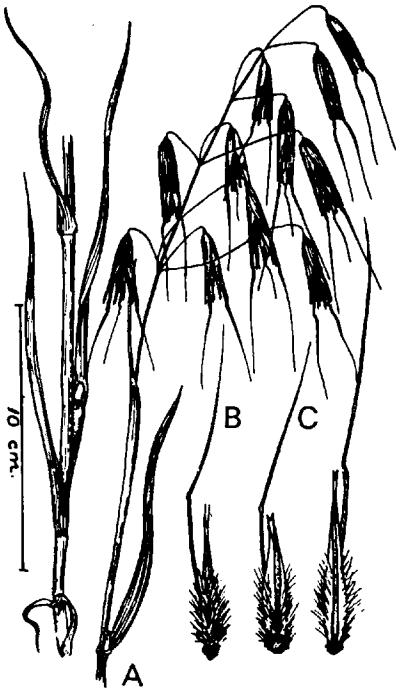
10. Body of lemma pale when mature; upper series of hair tufts conspicuously longer than those of lower series.

11. Glumes 5-9-nerved; panicle branches glabrous to scabrid-pubescent.

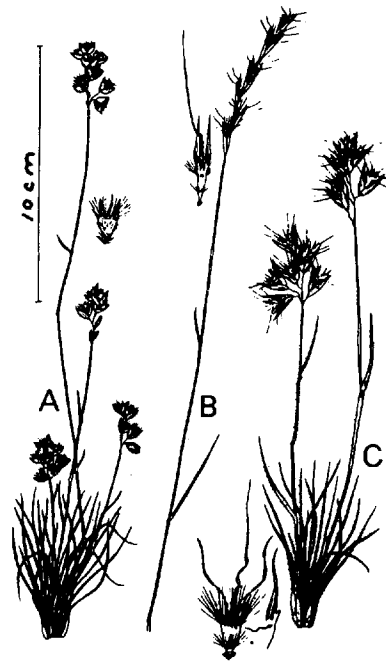
12. Tufted perennial to 60 cm. high; leaves sparsely hirsute, blades flat or inrolled-setaceous; panicle ovoid to oblong, 4-8 cm. long (awns included); spikelets 5-7-flowered; *glumes 16-20 mm. long*, broadly lanceolate, acuminate; *body of lemma 4-6 mm. long (with slender callus bearded at base)*; lobes narrow lanceolate, *the fine setose points to twice as long as base*; central awn 15-25 mm. long, twisted base brown; palea narrow lanceolate, glabrous on back, with membranous tip. Widespread species also found in Western Australia, South Australia, Victoria, New South Wales, and Tasmania; introduced in New Zealand and California; not uncommon in woodland and in native pastures. 'Ringed Wallaby Grass'.

8. *D. caespitosa* Gaudich.

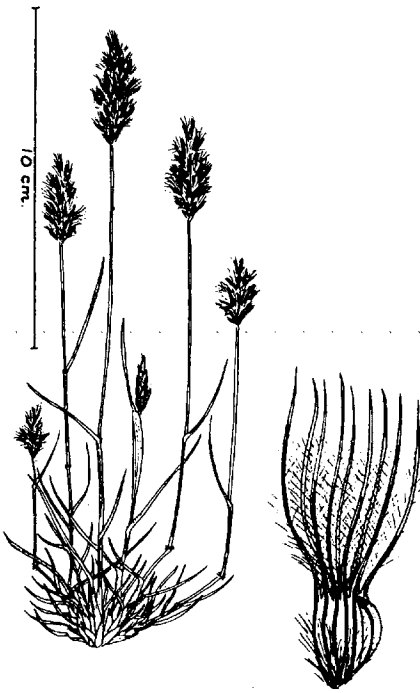
12a. Few-stemmed perennial, culms taller and more robust than in preceding from which it differs in the *glumes less than 17 mm. long*, *body of lemma about 3.5 mm. long*, *lateral lobes with setae shorter than or about equal to the base*, *the central awn up to 12 mm. long*, its short brown base once or twice twisted; palea oblanceolate to elliptical, hirsute on lower back. Found from south-eastern Queensland to Gippsland, Victoria; also recorded from



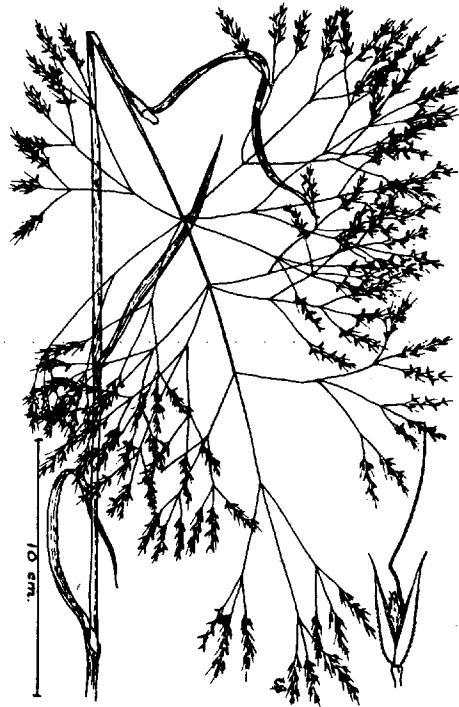
33. A. *Avena barbata*
 B. *Avena fatua*
 C. *Avena ludoviciana*



34. A. *Danthonia carphoides*
 B. *Danthonia penicillata*
 C. *Danthonia auriculata*



35. *Enneapogon nigricans*



36. *Agrostis avenacea*

South Australia and Tasmania; introduced in New Zealand; uncommon in the A.C.T. but growing on Black Mountain.

9. *D. purpurascens* J. Vickery

11a. Tufted *hirsute* perennial, hairs tubercle-based on leaf sheaths; panicles short, ovoid, *branches pilose or pubescent*; spikelets 4-6-flowered, often plump; *glumes 10-14 mm. long, 9-13-nerved*, broadly lanceolate, apices slender, margins purplish; body of lemma 3.5-4 mm. long (including narrow callus which has basal hair tuft); lateral lobes 2-3 times as long as body, the comparatively broad bases quickly narrowed to setae scarcely as long; central awn to 15 mm. long, twisted in lower part; palea obovate to oblong, sometimes hairy on back between nerves. New South Wales, Victoria, and South Australia; in the A.C.T. can be found in the Cotter and Murrumbidgee Valleys and on lower mountain slopes. Also as a distinctive subalpine form with spikelets less swollen in the middle, the upper hair tufts of lemmas more than twice as long as in lower series and central awn to 10 mm. long. Found at high elevations, Mt Franklin, Mt Bimberi, also Victoria.

10. *D. eriantha* Lindl.

10a. Tufted *glabrous* perennial to 60 cm. high, leaf blades flat or involute; panicle ovoid, 4.5-10 cm. long, lower branches to 6 cm. long; spikelets 5-8-flowered; glumes seldom gaping widely, purplish with pale margins or greenish, about 7-nerved, *with fragile setose apices*; body of lemma 3-4 mm. long, *turning golden-brown when mature, upper series of hair tufts less than twice as long as lower, commonly as long*, hairs of callus usually as long as callus; lateral lobes about twice as long as body, the membranous margins narrowing obliquely into the setae, central awn $\frac{1}{2}$ as long as lobes, twisted on brown lower half; palea elliptical-lanceolate, glabrous, membranous above, minutely bilobed. In damp or swampy sites near Canberra; also widespread in central New South Wales and Victoria.

11. *D. duttoniana* A. B. Cashmore

8a. Tufted perennial to 50 cm. high, culms short, leaf blades inrolled-setaceous, sparsely hirsute; panicle 4-6 cm. long, commonly racemose; spikelets 4-6-flowered, gaping later; glumes not much longer than lemma (awns excluded), 12-15 mm. long, thin margins narrow, nerves inconspicuous; body of lemma 4-5 mm. long, glossy, upper hair series dense, *lower series with dense marginal tufts*, callus hairs up to as long as body; lateral lobes about twice as long as body, lanceolate with setose apices, awn much longer than lobes, brown and spirally twisted below; palea lanceolate to oblanceolate, glabrous, often minutely bifid. Common in sclerophyll woodlands in the A.C.T.; also eastern New South Wales, Victoria, Tasmania, and South Australia; introduced in New Zealand.

12. *D. laevis* J. Vickery

7a. Upper series of hair tufts reduced to a pair of marginal tufts with or without a pair of small and sparse tufts near median line; panicle often reduced to a simple raceme.

13. Central awn spirally twisted at base; spikelets more than 1 cm. long: lateral lobes of lemmas with fine setae.

14. Basal series of hair tufts present though often sparse in centre above the acuminate base of the lemma which tapers into a slender callus.

15. Lateral lobes of lemmas tapering symmetrically into their setae.

16. Tufted perennials with slender culms, *leaves with tubercle-based hairs*; panicle much exerted from uppermost sheath, ovoid to subracemose; *spikelets crowded*, glumes as long as lemmas or the lateral lobes protruding above, comparatively narrow, 5-7-nerved; body of lemma 4-6 mm. long, narrow, lower hair series thin, upper series of scanty marginal and dorsal tufts, hairs of callus dense; lateral lobes about twice as long as body, tapering into fine setae; awn longer than lateral lobes, twisted below; palea oblanceolate, sometimes with few hairs on back. Open grassy areas in forests to 5000 ft elevation. Also in south-eastern

New South Wales, Victoria, Tasmania, and South Australia; introduced in New Zealand. 'Smooth-flowered Wallaby Grass'.

13. *D. pilosa* R.Br.

16a. Slender loosely tufted perennial to 70 cm. high, leaves glabrous or sparsely pilose, setaceous; panicle linear, racemose, *often curved or nodding*; spikelets slightly overlapping along rhachis but not crowded; glumes lanceolate, acuminate, 10-12 mm. long; body of lemma narrow above narrow callus, upper hair series with marginal tufts and sometimes with scanty hairs across the back; lateral lobes about twice as long as body, apices setose, awn brown, twisted below; palea narrow, glabrous. Common species of woodland and forest habitats; also in south-eastern New South Wales, Victoria, and Tasmania; introduced in New Zealand. 'Slender Wallaby Grass'. Fig. 34b.

14. *D. penicillata* (Labill.) Beauv.

15a. Sometimes forming dense tufts, leaves short, glabrous or pilose; panicle erect, narrow, racemose; spikelets scarcely overlapping along rhachis; glumes 8-14 mm. long, 5-7-nerved, as long as or shorter than lemmas (excluding awns); body of lemma narrow, hair tufts as in preceding species; lateral lobes to twice as long as body, with broad membranous-scarious margins tapering abruptly but asymmetrically into the setae, awn twice as long as lobes, twisted below. In similar habitats to the preceding in the A.C.T. but usually more common at lower elevations; widespread from south-eastern Queensland through New South Wales, Victoria, South Australia, to Tasmania; introduced in New Zealand. 'Slender Wallaby Grass'.

15. *D. racemosa* R.Br.

14a. Tufted perennial to 40 cm. high, leaves glossy, rigid with subpungent apices; panicle narrow, subracemose, 4-7 cm. long; spikelets 4-6-flowered; glumes longer than lemmas (excluding awns), 5-nerved, 9-12 mm. long; body of lemma 3-4 mm. long, elliptical, basal hairs reduced to pair of marginal tufts, upper series similar or with smaller tufts on median line; callus blunt, bearded; lateral lobes about $1\frac{1}{2}$ times as long as body, apices setose, awn 2-3 times length of body, brown, loosely twisted below; palea elliptical-lanceolate, glabrous. Common in grassy sward at high elevations in Australian Alps, not common in the A.C.T. but collected from Mt Gingera; also Victorian Alps and Tasmania. 'Snow Wallaby Grass'.

16. *D. nudiflora* P. F. Morris

13a. Tufted alpine perennial, leaves glabrous, inrolled-setaceous; panicle much exerted, subracemose, 2-4 cm. long; spikelets to 8 mm. long, 4-5-flowered; glumes longer than lemmas, lanceolate-elliptical, acute, purplish, nerves obscure; lemmas 3-4 mm. long (including awns), both upper and lower series of hairs reduced to marginal tufts; lateral lobes ovate-acuminate, with short setose apices, about as long as body, awn slightly longer, brown below but not twisted. With preceding species on Australian Alps, not yet recorded for the A.C.T. though perhaps present. Distributed from south-eastern New South Wales to Tasmania. 'Alpine Wallaby Grass'.

17. *D. nivicola* J. Vickery

Tribe: Pappophoreae

25. ENNEAPOGON Desv. ex Beauv. See Burbidge (1941)

Small tufted perennial, culms with bearded nodes, ligule ciliate, blades (in A.C.T. plants) 4-7 cm. long, 2-3 mm. wide; panicles compact, ovoid to oblong, 2-4 cm. long; glumes lanceolate, acuminate or acute, 5-nerved, sparsely glandular hairy, commonly almost black but fading to straw-colour when old, subequal, 4-5 mm. long; fertile lemma shortly oblong in side view, slightly ribbed by the 9 nerves which each pass into a spreading plumose awn; palea about as long as body of lemma, ciliate on the nerves. Sterile lemmas reduced and only the lower with a palea. Sometimes spreading-ascendent in habit. Common in *Danthonia*-

Stipa grassland and open woodland sites; found in Queensland, New South Wales, Victoria, South Australia and Western Australia. 'Niggerheads'. Fig. 35.

E. nigricans (R.Br.) Beauv.

Tribe: Agrostideae

26. AGROSTIS L. See Vickery (1941)

1. Lemmas glabrous.

2. Awn minute or absent.

3. Panicles 12-35 cm. long, with verticillate branches; perennials.

4. Plants rhizomatous; palea present though only $\frac{1}{2}$ to $\frac{2}{3}$ as long as lemma.

5. Glabrous perennial; *ligules on vegetative shoots short and broader than long*; panicle loose with stiff spreading branches which are bare towards their bases; spikelets 2-3 mm. long; glumes thin, lower scabrid on keel but *upper smooth on the keel*; lemma about $\frac{2}{3}$ length of glumes, thinly membranous, glabrous and unawned; palea membranous, about $\frac{1}{2}$ as long as lemma. Extensively used as a lawn grass and of European origin. 'Browntop Bent'.

1. **A. tenuis* Sibth.

5a. Perennial with coarser leaves than the above, *ligules on vegetative shoots longer than broad, blunt and toothed*; panicle with stiffly spreading branches of which at least some bear spikelets to the base; spikelets 2-3 mm. long; glumes thin, lower scabrid for full length of keel, *upper scabrid on upper half of keel*; lemma $\frac{2}{3}$ length of glumes, thin and unawned. Partially naturalised in Canberra area but of European origin; can be confused with *A. stolonifera* L. See also note concerning *Agropogon* (under 31. *Polyogon*).

2. **A. gigantea* Roth

4a. Slender tufted or stoloniferous perennial to 60 cm. high, leaf sheaths and blades scabridulous, ligule membranous and 2-5 mm. long; panicle lax and open, 10-30 cm. long, branches filiform and verticillate at lower nodes or 2-3-nate; spikelets 1.5-2.5 mm. long, purplish and gaping; glumes lanceolate, *scabrid on keels*; lemma shorter than glumes, thin glabrous and narrowly truncate, unawned; *palea absent*. In swamps at high elevations, e.g. Mt Ginini, Mt Gingera, Mt Bimberi, and Upper Cotter Valley; also New South Wales, Victoria, and Tasmania. Apparently native though indistinguishable from an American plant. 'Winter Bent'.

3. *A. hiemalis* (Walt.) B.S.P.

3a. Panicle not more than 15 cm. long (usually between 4 and 10 cm.) with 2-3-nate branches. Tufted and possibly annual.

6. Annual(?), leaves narrow, 1.5-2.5 cm. long; panicles exerted and up to 9 cm. long; spikelets 1.5-2 mm. long; glumes purplish, scabrid on keels; lemmas shorter than glumes, glabrous, truncate and unawned. On high slopes and ridges in the mountains; also in south-eastern New South Wales (Mt Kosciusko area), Victoria, and Tasmania. 'Hair Bent'.

4. *A. parviflora* R.Br.

6a. Densely tufted annual, leaves 2-8 cm. long, filiform but scabrid; panicles loose with capillary branches; spikelets 2.5-3 mm. long; glumes equal, scabrid on keels, minutely ciliolate on margins; lemmas shorter than glumes, membranous, narrowly truncate and unawned. Near swamps on high mountain ridges, e.g. Mt Ginini, Mt Gingera, Upper Cotter Valley; also eastern Victoria and Tasmania. 'Australian Bent'.

5. *A. australiensis* Mez

2a. Densely tufted annual to 14 cm. high; leaves 2-8 cm. long and minutely scabrid; panicle loose and forming more than $\frac{1}{2}$ the height of the plant, branches capillary, scabrid and 2-nate;

spikelets 2-4 mm. long (excluding awns); glumes lanceolate, scabrid on keels, subequal; lemma shorter than glumes, membranous, glabrous and narrowly truncate or minutely toothed, with a fine geniculate awn 4-6 mm. long from middle of the back. In swamps on Mt Ginini, Mt Gingera, and similar sites elsewhere; also in south-eastern New South Wales, Victoria, Tasmania, and Western Australia. 'Graceful Bent'.

6. *A. venusta* Trin.

1a. Lemma pubescent.

7. Ascendent annual, culms loosely tufted, sheaths loose but scabrid like the blades, ligules 3-8 mm. long; panicle open, often drooping when young, branches capillary, scabrid, and verticillate at the lower nodes; spikelets 2-4 mm. long, usually green, gaping; glumes lanceolate with green scabrid keels and hyaline margins, equal; lemmas $\frac{1}{2}$ to $\frac{3}{4}$ as long as glumes, softly villous, 4-nerved, truncate and awned from near middle of back; awn geniculate, about twice as long as glumes. On margins of creeks and rivers from open grassland to high mountain slopes. All Australian States, New Zealand, Pacific Islands. 'Blown Grass'. Fig. 36.

7. *A. avenacea* J. F. Gmel.

7a. Loosely tufted annual with loose sheaths and scabrid leaves, ligules 2-6 mm. long with ragged apex; panicle loose and spreading, rarely drooping, branches stiff, verticillate at lower nodes; spikelets 5-6 mm. long, usually purplish, gaping; glumes narrow linear-lanceolate, scabrid on keels, purplish and subequal; lemma about $\frac{1}{2}$ as long as glumes, villous with white hairs and with a geniculate awn about 4 times as long arising near middle of back. Higher slopes of mountains but less common than the preceding, Mt Tidbinbilla, Mt Gingera etc; distributed throughout temperate Australia and Tasmania. 'Blown Grass'.

8. *A. aemula* R.Br.

27. *DEYEUXIA* Clar. ex Beauv. See Vickery (1940)

1. Lemma not conspicuously longer than the lower glume and often shorter; panicle narrow and contracted or, if loose, the branches filiform.

2. Lemma with awn which projects from the spikelet.

3. Awn attached in the lower third or near base of lemma.

4. Erect perennial, variable in size of plants, culms slender or robust; sheaths smooth or scabrid, ligule membranous, 4-7 mm. long; blades flat or loosely involute and deeply channelled above, scabrid, up to 25 cm. long and 2.5-7 mm. broad; panicle dense, linear or narrow oblong, sometimes interrupted, 8-15 cm. long; spikelets 3-6 mm. long (usually 4.5-5.5 mm.); glumes unequal, lower slightly longer than upper, greenish up centre and scabrid on keel; lemma distinctly 4-toothed, shorter than glumes, narrow lanceolate-scabridulous; dorsal awn attached a little above the base, twisted and geniculate, much longer than lemma; callus bearded. In damp places in sclerophyll forest on mountain slopes; distributed in many areas of temperate Australia, Tasmania, and New Zealand. 'Reed Bent'.

1. *D. quadriseta* (Labill.) Benth.

4a. Tussocky perennial to 80 cm. high, culms densely retrorsely scabrid below panicles, sheaths scabrid, ligule membranous but scabrid; panicle linear or narrow lanceolate in outline, to 15 cm. long, sometimes interrupted at base, commonly reddish; spikelets 4.5-6 mm. long; glumes acute or acuminate, purplish when mature, scabrid ciliate on keels, lower slightly shorter than upper; lemma truncate and obscurely toothed, scabridulous, shorter than glumes; awn attached near base, twisted below geniculation and about 8 mm. long; callus hairy. Common throughout the mountain areas, especially in shallow soils of stony slopes

in dry forest; also found in south-eastern New South Wales, Victoria, and Tasmania.

2. *D. monticola* (Roem. et Schult.)

J. Vickery

Note: *D. monticola* var. *valida* J. Vickery is found in similar habitats. It differs in being less densely tussocky, the ligules about 4 mm. long, the glumes subequal and the spikelets 6-7 mm. long.

3a. Awn attached in the middle or upper third of the lemma.

5. Panicle dense, the spikelets on short appressed branches; spikelets more than 4 mm. long.

6. Awn attached in the middle third of the back of the lemma.

7. Tufted perennial to 30 cm. high; leaf sheaths loose; ligule 5-6 mm. long, membranous with ragged edge; *apex of blade conduplicate with minute up-turned tip*, upper surface channelled-striate, *exposed lower surface smooth*; panicle dense, linear-lanceolate, usually more than 4 cm. long (to 11 cm.); spikelets about 5 mm. long; glumes slightly unequal with the lower shorter than upper, keels scabrid, sides scabridulous; lemma shorter than glumes, truncate and bifid at apex, awn to 4 mm. long, *loosely twisted below geniculation*.

Note: The keeled apices of the leaves separate this from the next two species. In swampy ground at high elevations; also in Kosciusko area and in the Victorian Alps but not common.

3. *D. carinata* J. Vickery

7a. Apices of leaf blades inrolled and scabrid, both surfaces striate.

8. Tufted or ascendent perennial; leaf sheaths often purplish, striate and sometimes scabridulous; ligules 2-3 mm. long, obtuse; blades scabrid along the striations; panicle linear to narrow lanceolate and dense; spikelets up to 5 mm. long; glumes subequal with lower shorter, scabrid on keels; lemma shorter than glumes, scabrid, *awn arising from upper part of middle third, from half to as long as lemma, recurved but not twisted*. Damp sites at high elevations, e.g. on Mt Gingera and Mt Bimberi; also in Kosciusko area and in Victorian Alps.

4. *D. crassiuscula* J. Vickery

8a. Slender weak stemmed *tufted* perennial, sheaths much shorter than internodes; ligules only 1-2 mm. long; blades flat except near apex; panicle oblong or linear-lanceolate, rarely more than 4 cm. long; spikelets 3-4 mm. long; glumes subequal with the lower shorter, scabrid on keels; lemma scabridulous, minutely toothed at apex; *awn with brown or golden base tightly twisted below*, finely scabrid above geniculation. Has been found at high elevations on Mt Tidbinbilla, Mt Ginini, and Mt Gingera; also found in Victoria, Tasmania, and South Australia.

5. *D. minor* Benth.

6a. Erect tufted perennial to 1.2 metres high; sheaths scabrid; ligule up to 3 mm. long; blades flat, antrorsely scabrid on upper and retrorsely or antrorsely scabrid on lower surface; panicle linear-lanceolate when contracted but often rather loose, branches clothed with spikelets to their bases; spikelets 4-6 mm. long, greenish or purplish; glumes narrow-lanceolate with scabrid keels, subequal, upper sometimes 3-nerved; lemma scabrid, the *awn attached about 1 mm. below summit, angular striate and recurved but neither twisted nor geniculate*. Not uncommon in sclerophyll forests at higher levels and also near creeks and swamps at high elevations, e.g. Upper Cotter Valley, ridges of Brindabella Range, Mt Tidbinbilla; also Australian and Victorian Alps and in Tasmania. Fig. 37.

6. *D. brachyathera* (Stapf)

J. Vickery

5a. Panicle loose, spikelets on slender branchlets of which the longer are bare at base for 1-5 cm. of their length; spikelets 3-6 mm. long.

9. Robust tufted perennial, internodes longer than scabrid striate sheaths; ligules 3-4 mm.

long and membranous; blades flat, to 20 cm. long and 5 mm. wide; *panicle more than 15 cm. long (15-25 cm.), branches filiform and 4-5-nate*; spikelets 4-6 mm. long; lower glume slightly longer than upper, both scabrid on keels; lemma scabridulous, narrowly truncate; awn arising about the middle of the back, *twisted below* and almost geniculate, fragile and easily broken. Has been collected on eastern slopes of Brindabella Range; more common at higher elevations in eastern Victoria.

7. *D. frigida* F. Muell. ex Benth.

9a. Erect or ascendent perennial, internodes longer than finely scabrid sheaths; ligules 2-3 mm. long and ragged; blades flat, scabrid to pubescent; *panicle less than 12 cm. long, branches 2-3-nate*, loose or contracted; spikelets 3.5-4 mm. long; glumes slightly unequal, scabrid on keels, gaping when mature; lemma almost as long as glumes, densely scabridulous with a *short untwisted* awn attached near middle of back. Mt Ginini and eastern slopes of Brindabella Range.

8. *D. aff. rodwayi* J. Vickery

2a. Small tufted perennial, leaf blades inrolled-setaceous when dry, glabrous or minutely scabridulous, 2-4 cm. long; panicle projecting well above basal leaf tufts, purplish, narrow, 2-6 cm. long, branches scabrid, nodding when old; spikelets 2-2.5 mm. long; glumes subequal and scabrid on keels; *lemma slightly longer than glumes*, apparently unawned or with a very minute point slightly below the apex. In peaty soil near minor creeks and swamps at high elevations, e.g. Mt Gingera and Mt Bimberi.

9. *D. sp.*

1a. Slender tufted or ascendent perennial of low stature; sheaths scabridulous, shorter than internodes; ligule 1 mm. long; blades setaceous, involute and scabridulous; panicle 2-6 cm. long, *open and pyramidal with the rigid branches clustered to the side of each node* and spreading; spikelets about 2 mm. long, often purplish; *glumes about half as long as lemma*, oblong, obtuse and slightly keeled above; lemma lanceolate with prominent nerves, obtuse to truncate with a short straight awn attached a little below summit. Not uncommon in cool shaded or damp sites in sclerophyll forests of the higher mountain slopes; also found from south-eastern Queensland to Tasmania.

10. *D. gunniana* (Nees) Benth.

28. DICHELACHNE Endl.

1. Panicle narrow and usually dense, if interrupted then the branches bearing spikelets to their bases.

2. Perennial with short scabrid leaves in basal tuft, blades flat or inrolled-setaceous; panicles on tall slender culms, erect or nodding, *less than 1.5 cm. in diameter* (excluding awns), *never loose and open*, rarely interrupted; spikelets concealing rachis, narrow; glumes scarious, narrow lanceolate, ciliate or scabrid on keels, lower 5-7 mm., upper 6-8 mm. long; lemma linear, sparsely or densely scabrid, callus blunt and hairy; *awn 1.5-3 cm. long* ($1\frac{1}{2}$ -3 times length of lemma), arising between minute scarious lobes, scabrid, commonly twice geniculate. Variable species approaching the following in panicle characters. Very common in dry sclerophyll habitats up to at least 5000 ft; throughout temperate Australia, also in New Zealand. 'Short-haired Plume Grass'. Fig. 38.

1. *D. sciurea* (R.Br.) J. D. Hook.

2a. More robust than preceding; *panicle more than 1.5 cm. diameter* (awns excluded), dense, oblong or elliptical-cylindrical; glumes unequal, lower 6-8 mm. upper 8-9 mm. long, lemma with awn placed well below scarious apex and more than 3 cm. long; awns conspicuous and concealing spikelets. Less common than preceding but with similar distribution. 'Long-haired Plume Grass'.

2. *D. crinita* (L.f.) J. D. Hook.

1a. Slender perennial, culms rigid, leaf blades narrow and inrolled when dry, commonly scabrid or pubescent-scabrid; *panicle loosely contracted and diffuse, most of the branches bare at their bases*, 5-15 cm. long with spikelets divaricate; glumes very unequal, lower 3-5 mm. upper 4-6 mm. long; lemma usually very scabrid but sometimes almost smooth; *awn less than 2 cm. long*, twice geniculate and conspicuous. In similar habitats but more commonly in mountain areas.

3. **D. rara** (R.Br.) J. Vickery

29. PENTAPOGON R.Br.

Slender perennial with culms to 60 cm. high, leaves scabrid-villous like the nodes and lower internodes; panicles loosely contracted or lax, branches scabrid; spikelets narrow but later gaping; glumes scabrid and scabrid on the keel, often with 1-2 pairs of short lateral nerves; lower 4-6 mm. and upper 5-9 mm. long; lemma narrow, glabrous or minutely scabridulous, bearded on short oblique callus, body shorter than the lower glume, lateral awns setaceous, scabrid and about as long as the twisted base of the stouter central awn but unequal; central awn geniculate and at least 3 times as long as glumes. In woodland habitats, e.g. Kambah, Booroomba, Blundell's Flat; also New South Wales, Victoria, Tasmania, and South Australia. 'Five-awn Spear Grass'. Fig. 39.

P. quadrifidus (Labill.) Baill.

30. ECHINOPOGON Beauv. See Hubbard (1935)

1. Spikelets 5-10 mm. long, lemmas with setiform lobes up to 2.5 mm. long.

2. Loosely tufted perennial, sheaths retrorsely scabrid, blades with acute or subpungent apices, to 14 cm. long and 10 mm. wide, sparsely hairy or glabrous or scabrid; *panicle nodding or inclined*, lanceolate to oblong and dense, 2.5-6 cm. long, 1-3 cm. in diameter (awns included); *peduncle slender and smooth*; spikelets linear-lanceolate; 7-10 mm. long (excluding awns); glumes narrow lanceolate, acute, scabrid or ciliate on keel; lemma linear-lanceolate, 6-7 mm. long, minutely hispid above, callus hairy; lobes rigid and scabrid, to 2.5 mm. long, awn 0.8-2 cm. long and scabrid or minutely hispid. Grows among ground cover species in sclerophyll forests, especially at intermediate altitudes, e.g. Mt Tennent, Mt Tidbinbilla, Gudgenby; also in eastern New South Wales and extreme north-east of Victoria. 'Long-flowered Hedgehog Grass', or 'Rough Bearded Grass'. Fig. 40.

1. **E. cheelii** C. E. Hubbard

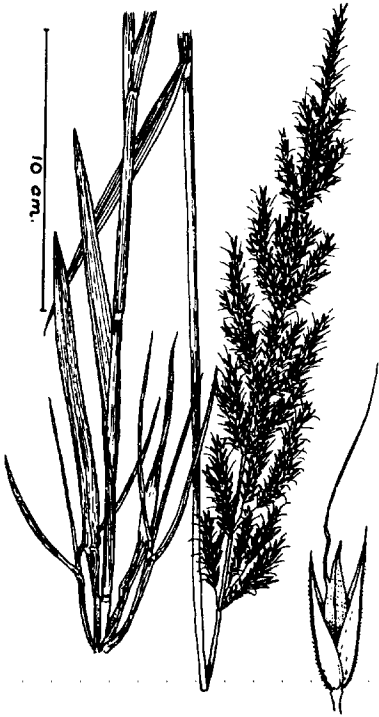
2a. Loosely tufted perennial with glabrous or rarely retrorsely scabrid leaf sheaths, blades 2.5-3 cm. long, 3-7 mm. wide, glabrous or scabrid; *panicle erect*, dense, ovoid to oblong, 3-6 cm. long, 2-4 cm. in diameter (awns included); *peduncle retrorsely scabrid*; *spikelets 5-7 mm. long*, linear-oblong; glumes narrow-lanceolate, loosely but stiffly ciliate on keel; lemma linear-lanceolate, 4-5 mm. long, hispid above, callus hairy; lobes stiff and scabrid, 2-2.5 mm. long; awn 1-2.5 cm. long, hispid below and scabrid above. Recorded for Burrinjuck area and probably in the A.C.T.; also south-eastern Queensland, and New South Wales. 'Erect Hedgehog Grass'.

2. **E. intermedius** C. E. Hubbard

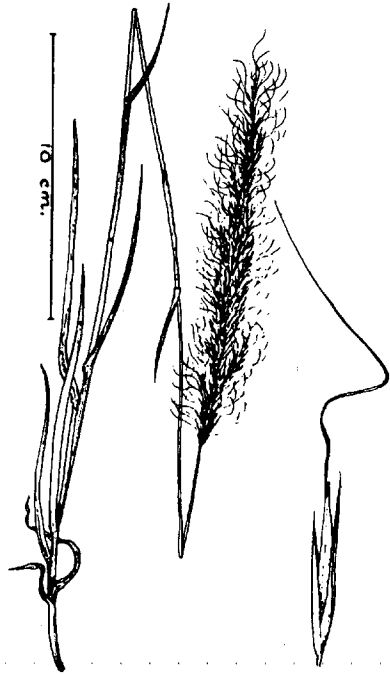
1a. Spikelets 2.5-5 mm. long; lemma acute, bilobed or entire at the apex.

3. Perennial with culms loosely to densely *tufted*, sheaths glabrous or retrorsely scabrid, blades to 25 cm. long, 1.5-5 mm. wide and scabrid; panicle oblong, 3-5 cm. long, green or purplish; spikelets green or purplish; glumes lanceolate to linear-oblong, keel rigidly ciliate; lemma lanceolate to oblong, *bilobed or entire, the lobes obtuse or acute and rarely 1.5 mm. long*; awn 14 mm. long. Has been collected in the Black Mountain area; also south-eastern Queensland and New South Wales. 'Tufted Hedgehog Grass', 'Bearded Grass'.

3. **E. caespitosus** C. E. Hubbard



37. *Deyeuxia brachyathera*



38. *Dichelachne sciurea*



39. *Pentapogon quadrifidus*



40. *Echinopogon cheelii*

3a. Culms ascending from a creeping rhizome, loosely clustered or solitary; sheaths retrorsely scabrid or smooth; blades 1.5-6 cm. long, 2-8 mm. wide, scabrid, upper blades spreading or reflexed; panicle ovate to oblong, erect, 0.8-5 cm. long, 1-2.5 cm. in diameter (awns included); spikelets 3.5-5 mm. long, rarely purplish, horizontally spreading when mature; glumes narrow lanceolate, ciliate on keel; lemma linear-lanceolate, minutely bilobed or entire; scabrid awn 3-15 mm. long. In sclerophyll forests in mountain areas, e.g. Uriarra, Five Crossings, Tidbinbilla, Fitz's Hill and also on Black Mountain; widespread in Australia and Tasmania; also in New Zealand and on Norfolk Is. 'Forest Hedgehog Grass'.

4. *E. ovatus* (G. Forst.) Beauv.

31. POLYPOGON Desf.

Slender tufted annual, 5-15 cm. high; leaves glabrous, blades flat, ligule membranous; panicle dense but soft, cylindrical or oblong, 2-8 cm. long; spikelets 2-2.5 mm. long; glumes pubescent with the midrib continued as a fine awn 2-3 times as long from a shallow apical notch; lemma $\frac{1}{2}$ as long as the glumes, denticulate at apex and with a short deciduous awn. Naturalised throughout temperate Australia, usually in shaded or moist habitats; of European origin, also native in Asia and Africa. 'Annual Beard Grass'. Fig. 41.

**P. monspeliensis* (L.) Desf.

Note: It is possible that specimens of an intergeneric hybrid between *Polygogon* and a species of *Agrostis* may be encountered. These hybrids may be placed under *Agropogon* (a name taking its parts from those of the parents). Hubbard has described a grass as *Agropogon littoralis* believed to have resulted from a cross between *Polygogon monspeliensis* and *Agrostis stolonifera*. Local plants referable to *Agropogon* have been collected in the Kambah area but there is some doubt as to the species of *Agrostis* which may be involved.

Hybrid plants differ from typical *Polygogon* in having a lobed or interrupted panicle up to 10 cm. long, glumes with shorter awns, and lemmas with the awn attached near the apex. It differs from species of *Agrostis* in minutely notched glumes and in the high placement of the awn on the lemma.

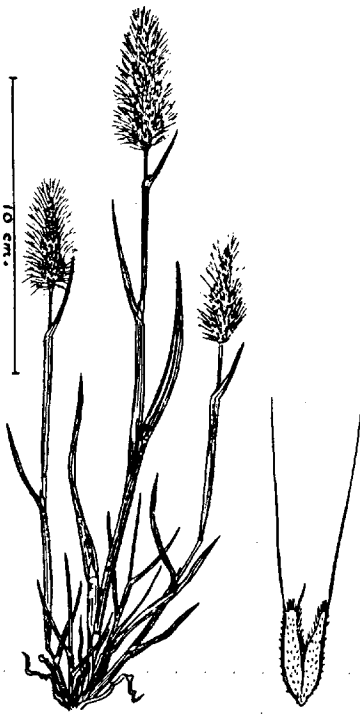
32. PHLEUM L.

Tufted perennial with erect or ascendent culms to more than 1 metre high, the basal internodes sometimes swollen; sheaths and blades striate, the blades scabrid on upper surface especially towards apices, ligules membranous, obtuse or torn; panicle a dense narrow cylindrical spike, 6-14 cm. long, 5-8 mm. in diameter, spikelets dense, very numerous, laterally flattened; glumes truncate, membranous apart from the prominent 3-nerved ciliate keel which is produced above in a rigid erect awn less than $\frac{1}{2}$ as long; lemma shorter than glumes, membranous and obtuse. Of European origin this introduced pasture grass has become naturalised in many areas of temperate Australia though not common. It is best suited to cold wet soils but has not been much used in the A.C.T. where it is of rare occurrence. 'Timothy'. Fig. 42.

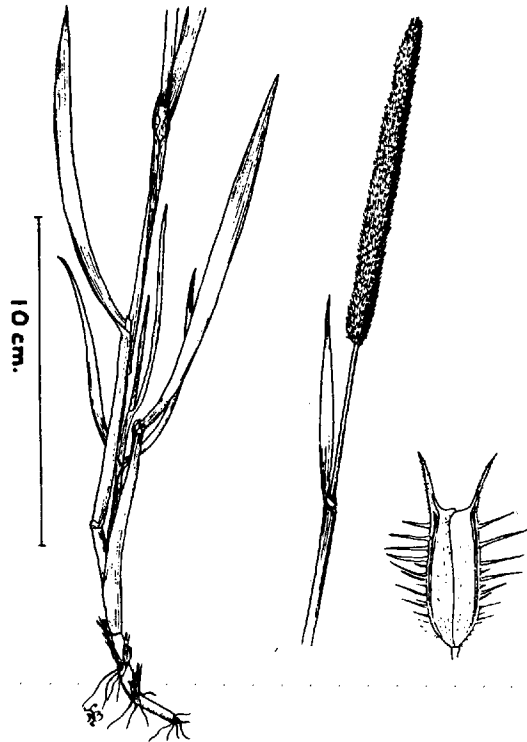
**P. pratense* L.

33. LAGURUS L.

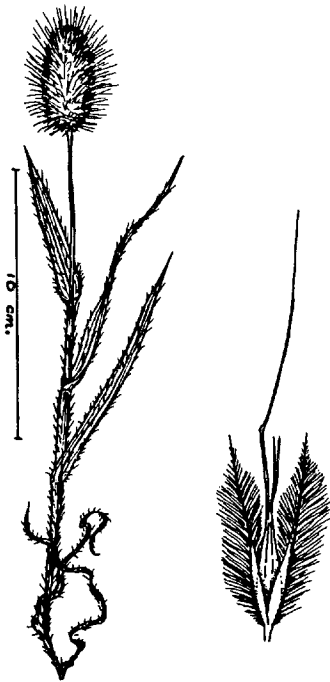
Slender annual with flat softly pubescent leaves; panicle 2-4 cm. long, ovoid, pale, softly silky; spikelets narrow lanceolate; glumes 6-10 mm. long, green soon fading to light brown, villous and tapering into plumose awns; lemma shorter than the glumes, scabrid or minutely pubescent, bifid with 2 awn-like points or setae about $\frac{1}{2}$ as long as the body, a twisted geniculate awn about twice as long arising from the back near the summit. Of Mediterranean origin, widely naturalised in temperate Australia and to be found in grassy areas and waste



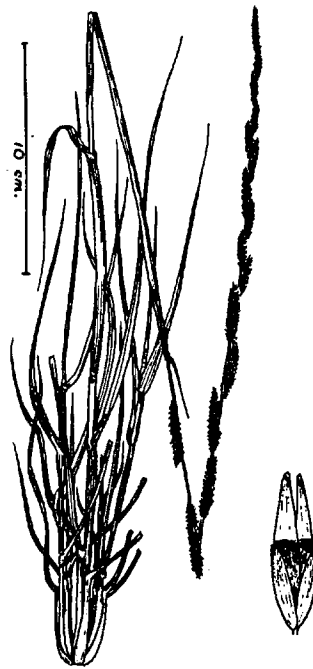
41. *Polygomon monspeliensis*



42. *Phleum pratense*



43. *Lagurus ovatus*



44. *Sporobolus elongatus*

ground on Black Mountain, or in the Molonglo and Murrumbidgee valleys. 'Hare's-tail Grass'. Fig. 43.

**L. ovatus* L.

Tribe: Sporoboleae

34. SPOROBOLUS R.Br.

Slender glabrous tufted perennial with dense butt and slender leaves with setaceous apices; panicle very narrow, 15-30 cm. long, 3-5 mm. in diameter, the branches erect and pressed against the rachis and sometimes distant from one another; spikelets close and crowded on the branches, lead-coloured, 2 mm. long; glumes subequal, little less than 1 mm. long, membranous, 1-nerved; lemma 2 mm. long, 3-nerved, lanceolate acute; palea as long as lemma and membranous; anthers 0.5 mm. long; seed truncate, 0.5-0.75 mm. long, visible through the membranous lemma and palea. Common in grassland and woodland of river valleys. More common in drier districts of western New South Wales and other mainland States except Victoria. The dark grey spikelets fade to straw colour when old. 'Slender Rat's-tail Grass'. Fig. 44.

S. elongatus R.Br.

Note: It is possible that *S. africanus* (Poir.) Robyns et Tournay (*S. capensis* (Willd.) Kunth) will be found in the A.C.T. Though not yet recorded here it occurs in adjacent parts of New South Wales and in Victoria. It differs in having the panicle a continuous, not an interrupted, spike, the lemmas are about 2.5 mm. long, the anthers are 1.1-1.25 mm. long (as against 0.75 mm.) and the seed is 1.25 mm. long and more than $\frac{1}{2}$ as long as the slightly hardened lemma and less truncate than that of *S. elongatus*.

Tribe: Stipeae

35. STIPA L.

1. Lemma without an apical ciliate crown, sometimes with an apical tuft of longer hairs.
2. Awn glabrous, scabrid or pubescent but not plumose; plant scabrid or glabrous.
3. Awn slender, less than 7 cm. long.
4. Densely tufted perennial, *rarely more than 8 cm. diameter at leafy butt*, nodes glabrous but internodes scabrid-pubescent below nodes; blades involute or inrolled, *filiform-setaceous, scabrid-pubescent*; panicle more than $\frac{1}{2}$ height of plant, base commonly clasped by uppermost sheath, narrow but loose, usually nodding to one side, 20-30 cm. long; spikelets narrow linear; glumes shining-scarious, *nerves not prominent*; lower 3-nerved, 12-14 mm. long; upper 5-nerved, 9-12 mm. long; lemma 6 mm. long (with 2 mm. callus), pubescent; awn 5-6.5 cm. long, twisted column 1.2-1.4 cm. long, *upper part curved like a sickle*. Common in native pastures. Sometimes regarded as belonging to *S. variabilis* Hughes or to *S. scabra* Lindl. but differing in slender habit with erect filiform-setaceous leaves with very short sheaths which, even on the culm, do not cover the nodes. 'Slender Spear Grass'.

1. *S. falcata* Hughes

- 4a. Upper untwisted part of awn straight above double bend; glumes striate with prominent nerves.
5. Densely tufted perennial, *culms 60-120 cm. high, tussocks 15-30 cm. diameter at butt*, nodes pubescent; panicle 30-50 cm. long, lax, branches verticillate, filiform; spikelets with glumes curved around or distended by lemma; *glumes slender acuminate, nerves prominent*, lower 14-18 mm. long, 3-nerved, nerves scabridulous; upper 10-12 mm. long, scabridulous in upper third, 5-nerved; lemma 8 mm. long (with 1-1.5 mm. callus), clothed with dense silky hairs, the long apical ones around base of awn; awn scabrid, 3.5-4.5 cm. long. Common

in marginal grasslands and forest. Willis, *Handbook to Plants in Victoria*, 1: 185 (1962) suggests this may be synonymous with *S. blackii* C. E. Hubbard but it differs as follows: margins of culm leaves with broad nerveless margins (commonly produced above ligule), blades more or less erect and without flaring of margins at base, larger spikelets, upper glume not scabridulous for whole length, apical hairs of lemma not forming a dense brush. It has also been confused with *S. aristiglumis* F. Muell. but in this the lemma is less hairy towards apex and there are no hairs or only 1 or 2 longer ones at base of awn. 'Tall Spear Grass'. Fig. 45.

2. *S. bigeniculata* Hughes

5a. Habit less robust than in preceding, rarely more than 60 cm. high, nodes (and internodes below them) pubescent, sheaths scabrid or scabrid-pubescent, blades inrolled, retrorsely scabrid; panicle narrow with long internodes; *glumes not distended around lemma, not acuminate*, thin, *ragged at blunt apices*, lower 9-12 mm. long, 3-nerved, upper shorter, 3-5-nerved; *lemma sparsely hairy, hairs not obscuring scabrid undersurface*, 6-8 mm. long, callus with pale hairs. Less common than preceding, occurs in mountain gullies, e.g. Five Crossings on Condor Creek.

3. *S. nervosa* J. Vickery

3a. Densely tufted perennial, leaves glabrous except near orifices, ligule short, ciliate, *blades rigid with sharp apices*, to 30 cm. long; panicle to more than twice height of leaves, subracemose; glumes to 25 mm. long, lower 3-nerved, upper slightly shorter, 5-nerved; *lemmas densely silky-villous*, 12-13 mm. long (incl. 2-3 mm. callus), hairs thinner towards glabrous or scabridulous summit; *awn 9.5-10.5 cm. long*, column forming more than $\frac{1}{2}$ length, pubescent near double geniculations. Widespread at high elevations of Australian Alps, also restricted alpine areas in Victoria; in the A.C.T. grows on Mt Gingera and Mt Bimberri, at high levels. 'Alpine Spear Grass'.

4. *S. nivicola* J. H. Willis

2a. Awn plumose. Plants softly pubescent, or subglabrous on upper sheaths.

6. Tussocky perennial to 1 metre high, butt of plant to 20 cm. diameter, leaves softly pubescent, blades inrolled, ligule pubescent and ciliate; *panicle dense, oblong or elliptical*, 10-20 cm. long (excluding awns), pale, not always fully exerted from uppermost sheath; *glumes about 15 mm. long*, pale or purplish, upper slightly shorter than lower; lemma 5.5-6.5 mm. long (including 1.5 mm. villous callus), brown when mature, with appressed white silky hairs; awn 3.5-4 cm. long, twice geniculate, column twisted and villous with hairs to 1 mm. long, bristle scabrid, about 18 mm. long. Shallow soils in dry woodland or forest habitats at low elevations, e.g. Black Mountain, Mt Ainslie, Mt Majura.

Note: The Victorian representatives of this and the following are both placed in *S. semi-barbata* R.Br. in Willis, *Handbook to Plants in Victoria*, 1: 184 (1962). 'Hairy Spear Grass'.

5. *S. densiflora* Hughes

6a. Tufted perennial to 70 cm. high, lower parts of sheaths, blades and culms pubescent, upper parts scabrid (often retrorsely so); *panicle narrow but not dense; glumes 18-25 mm. long*, glabrous or minutely pubescent and ciliate on nerves; lemma 7-8 mm. long with the villous callus, pale hairs scanty towards summit; awn 7-9 cm. long, column plumose and shorter than scabrid bristle. Dry sclerophyll habitats. (See note under preceding.) 'Soft Spear Grass'.

6. *S. mollis* R.Br.

1a. Short leaved tufted perennial, culms glabrous except for pubescent nodes, leaves with spreading stiff hairs, blades mostly less than 10 cm. long; panicle often less than 12 cm. long, basal spikelets (enclosed by uppermost leaf sheath) more or less cleistogamous; spikelets

purplish; glumes hairy on nerves, lower 14-16 mm. long and 3-nerved, upper shorter but 3-5-nerved; lemmas about 8 mm. long (including villous callus), *papillose-scabrid with conspicuous nerves and with ciliate crown at base of awn*; awn 6-7 cm. long, twice geniculate, subplumose on twisted column, bristle scabrid. Of South American origin, naturalised in some places in New South Wales and Victoria; collected near Burbong from where it may spread downstream along the Molonglo. 'Needle Grass'.

7. **S. neesiana* Trin. et Rupr.

36. ORYZOPSIS Michx.

The American species *O. miliacea* (L.) Benth. et J. D. Hook. ('Rice Millet') was introduced for pasture trial some years ago. Plants have been collected on rubbish dumps near Canberra but the species may not have been persistent. Differs from *Stipa* in the short awn being deciduous and straight or almost so. The wiry culms are up to 1.2 metres high, the panicle large with numerous small spikelets.

37. NASSELLA E. Desv.

Densely tussocky perennial, sheaths very short, blades 20-50 cm. long, finely setaceous, smooth or scabrid; panicle open and lax, branches filiform, very brittle, often drooping when mature; spikelets on filiform pedicels; glumes ovate or broadly lanceolate, curving around plump lemma but with slender acuminate apex, 3-nerved, lower 6 mm. long, upper slightly shorter, both purplish below and hyaline above when young; lemma shortly obovoid, scabrid 1-2 mm. long; callus short and obtuse, awn filiform, arising from truncate or obtuse summit, to 3 cm. long, slightly bent but not geniculate, scarcely twisted. Of South American origin and a serious weed of pastures, more prevalent in adjacent areas than in the A.C.T. 'Serrated Tussock'. (This species is placed under *Stipa* in current works on South American grasses but left under *Nassella* here to avoid confusion in popular usage.) Fig. 46.

**N. trichotoma* (Nees) Hack. ex
Arch.

Tribe: Aristideae

38. ARISTIDA L.

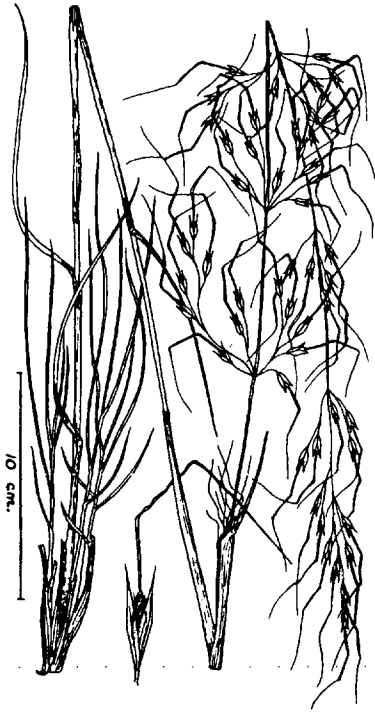
1. Tufted perennial with wiry culms and *few branches from lower nodes*, leaves glabrous with narrow blades; panicle open; branches short, divaricate, lower bearing 4-6 slender spikelets 8-10 mm. long (excluding awns); *glumes 4 mm. and 5 mm. long respectively*, purplish; lemma 9-10 mm. long, mottled with purple, convolute so that only one margin is visible; *awns 6-9 mm. long*, slender, spreading. On shallow soils in open woodland or grassland; also New South Wales. 'Three-awned Spear Grass'.

1. *A. vagans* Cav.

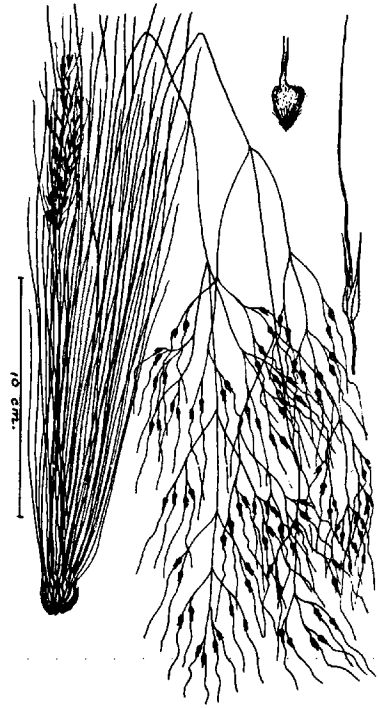
1a. Tussocky perennial with wiry divergent culms, *commonly with several branches from each of the upper nodes*, subtending sheaths loose; panicle narrow, spikelike or loose, branches erect when dry; spikelets 9-10 mm. long (awns excluded); *glumes 6-8 mm. long* (lower 6-7, upper 7-8 mm.) purplish; lemma 8-8.5 mm. long, purple-mottled, convolute, *awns 12-15 mm. long* with flattened bases. Open habitats and also along banks of creeks and rivers. Usually in sandy or shallow soils. Widespread in eastern Australia. 'Purple Wire Grass'. Fig. 47.

2. *A. ramosa* R.Br.

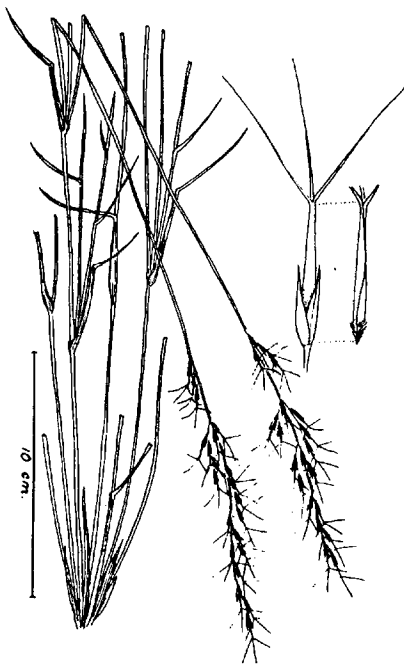
Note: A single specimen of *A. behriana* F. Muell. was recorded from near Civic Centre some years ago. It has recently been found in the CSIRO grounds at Black Mountain.



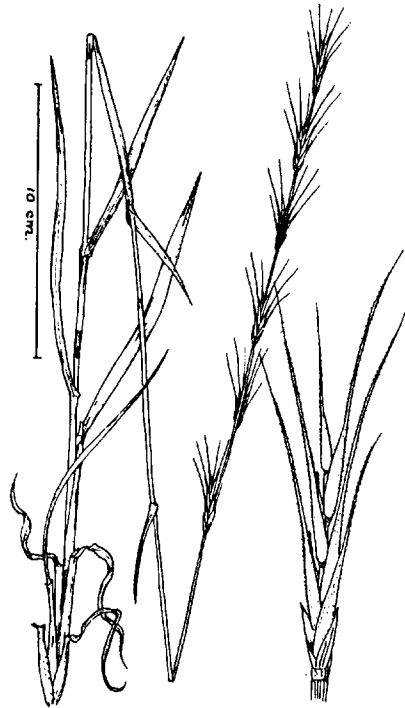
45. *Stipa bigeniculata*



46. *Nassella trichotoma*



47. *Aristida ramosa*



48. *Agropyron scabrum*

Tribe: Hordeae

39. AGROPYRON Gaertn.

1. Perennial, leaves mostly tufted at bases of long erect culms, sheaths more or less auriculate at junction with blades which are scabrid or scabrid-hairy (especially on upper surface and margins). *Panicle spike-like, slender, nodding, spikelets sessile, singly alternate and scarcely overlapping along rhachis*, 6-12 flowered, 2-2.5 cm. long (excluding awns), lemmas spreading with awns recurved when older; glumes 4-6 mm. long, subequal, 3-5-nerved, green or purplish with pale margins; lemmas scabrid on nerves towards summit where they pass into *rigid scabrid awns up to 4 cm. long*; palea often partly exerted from its lemma, ciliate on keels. (Size of lemmas varies, being larger if seed is matured within.) Common species from grassy plains of lower elevations to mountain slopes at 3000 ft or more. Widespread in southern Australia and Tasmania. 'Common Wheat Grass'. Fig. 48.

1. *A. scabrum* (R.Br.) Beauv.

1a. Erect few-stemmed perennial, culms and lower sheaths minutely pubescent, blades stiff and suberect, glabrous below, scabrid and striate on upper surface; *panicle erect, spike-like, dense*, 2-4.5 cm. long; spikelets densely biseriate; glumes subequal, 6-7 mm. long, keel prominent and scabrid above, *narrowed into a short pungent awn less than 10 mm. long*; lemmas lanceolate, 8-10 mm. long with awnlike apex, glabrous or minutely pubescent, keeled above by scabrid midrib, lateral nerves green; palea ciliate. At high elevations in Australian Alps, also Victoria and Tasmania; has been collected on Mt Gingera, A.C.T. 'Velvet Wheat Grass'.

2. *A. velutinum* Nees

40. TRITICUM L.

Erect annual, leaf blades flat, ligule membranous, junction of sheath and blade with claw-like auricles encircling culm; panicle erect, short, dense, spike-like; spikelets sessile and alternate on jointed rhachis against which one side is adpressed; glumes convex, oblong and obtuse, mucronate or awned; lemmas 3 to 5 with 'pinched in' apex (awned in bearded wheats); glumes and lemmas smooth and shining when mature. Important cereal which may be found where grain has been dropped near stockyards or in fallow ground but not truly naturalised. 'Wheat'. Fig. 49.

**T. aestivum* L.

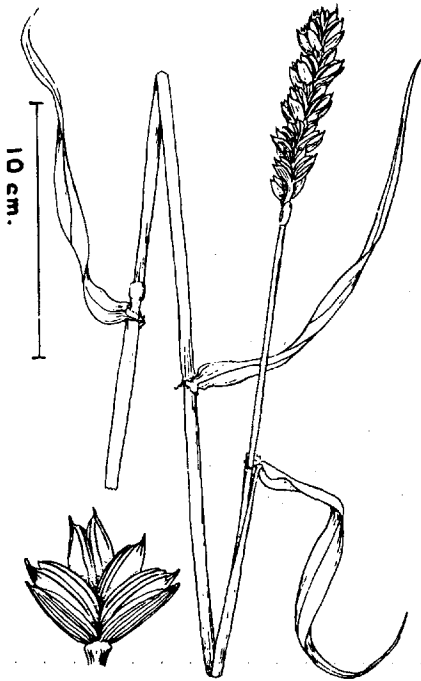
41. HORDEUM L.

1. Ascendent annual 15-40 cm. high, sheaths glabrous; ligule membranous, truncate or ragged; blades sparsely villous or scabrid, auricles encircling culm at base; panicle narrow, dense, spike-like, at first held by sheath; spikelets in 3s at each node of rhachis, central spikelet fertile, laterals sterile but *longer than central one*; glumes rigid, *narrowed into scabrid ciliate awns 10-15 mm. long*; lemma of central spikelets lanceolate, 10 mm. long with terminal awn to 20 mm. long. A Mediterranean species widely naturalised in temperate and semi-arid areas of southern and eastern Australia. Common on waste or cultivated ground. It has been confused with *H. murinum* L. in which the lateral spikelets are shorter than or as long as the central one in each triplet. 'Barley Grass'. Fig. 50.

1. **H. leporinum* Link

1a. Lateral spikelets shorter than central one; glumes with scabrid not ciliate awns.

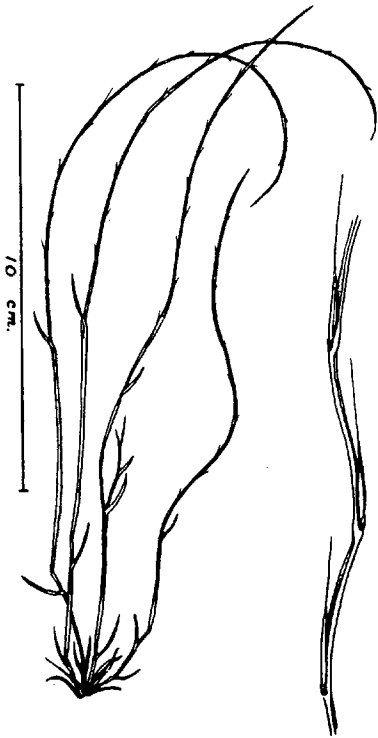
2. Annual of slender habit; panicle 2-5 cm. long, soon breaking up when mature; *glumes of lateral spikelets slender terete or the inner asymmetrically flattened (up to 0.6 mm. wide) at the base but both hardened and scabrid to base*; lemma very slender and sometimes vestigial; lemma of central spikelet 6-7 mm. long with awn 12-20 mm. long, awns often purplish when young. Originally from the Mediterranean area, now naturalised in southern and



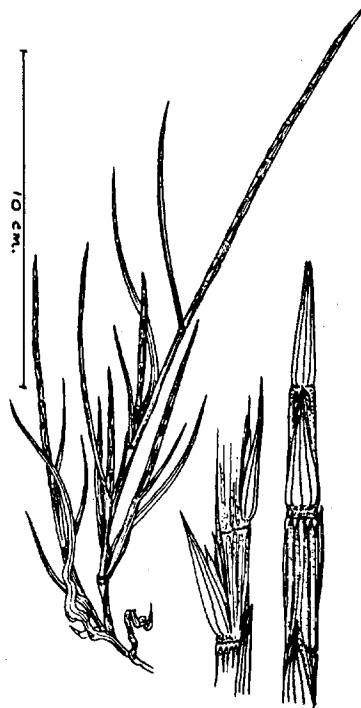
49. *Triticum aestivum*



50. *Hordeum leporinum*



51. *Psilurus incurvus*



52. *Monerma cylindrica*

eastern Australia, not uncommon in the A.C.T. especially in swampy habitats including those with saline soils. 'Mediterranean Barley'.

2. **H. geniculatum* All.

2a. Annual closely resembling the preceding in habit; *glumes of lateral spikelets dissimilar, the inner flattened (0.7-1.2 mm. wide) at the base which has a scarious margin and is less scabrid than the awn*; lemma often about $\frac{1}{2}$ the size of that of the central spikelet, lanceolate and sometimes containing anthers as well as a palea. Originally from coastal areas of western Europe and the Mediterranean, naturalised in parts of southern Australia but rare in the A.C.T. There seems to be no clear distinction between this species and the preceding since intermediates bridge the differences shown by the extreme forms. It is possible that all A.C.T. specimens should be placed under *H. geniculatum* but since some match authentic material of *H. marinum*, which is the earlier name, both are included in this account.

3. **H. marinum* Huds.

Note: Cultivated barley may occasionally persist for short periods near stockyards or on fallow areas. If found it will probably be 'Six-rowed Barley' (*H. vulgare* L.) in which each of the 3 spikelets in a cluster forms a seed.

Tribe: Monermeae

42. PSILURUS Trin.

Annual with few filiform culms, leaves glabrous, ligule short and membranous, blades 1-4 cm. long, inrolled; panicle a filiform spike 4-10 cm. long, purple and often curved; spikelets closely and alternately sunken into hollows along the rhachis; glume against rhachis suppressed, the other minute, about 0.5 mm. long; single lemma 4 mm. long, very narrow with fine hairlike awn as long as itself; palea membranous, hidden except at anthesis. Of Mediterranean origin and locally common in some natural pastures; also naturalised in scattered sites in South Australia, Victoria (Wimmera), and New South Wales. 'Bristle-tail Grass'. Fig. 51.

**P. incurvus* (Gouan) Schinz et Thell.

43. MONERMA Beauv. See *Runemark* (1962)

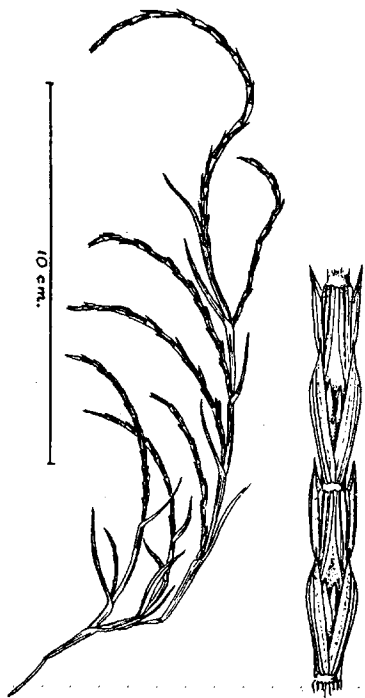
Tufted annual 10-30 cm. high, most of plant formed of the spikelike panicles; leaves glabrous, ligule short, membranous; panicle 5-15 cm. long, 1.5-2 mm. diameter; spikelets alternately sunken in hollows along rhachis; lower glume suppressed against rhachis (except in terminal spikelet), the upper glume covering the hollow 4-7 mm. long, 5-7-nerved; lemma membranous, shorter than glume. A Mediterranean species widely naturalised in temperate Australia, uncommon in the A.C.T. but present near Lake George and in Kambah area. 'Common Barb Grass'. Fig. 52.

**M. cylindrica* (Willd.) Coss. et Durieu

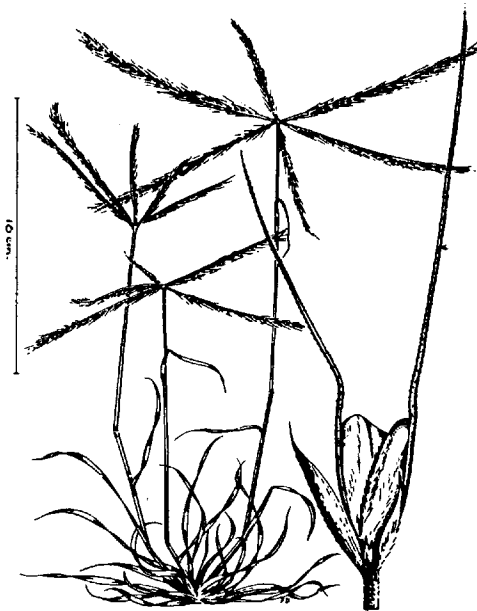
44. PARAPHOLIS C. E. Hubbard See *Runemark* (1962)

Glabrous annual similar to *Monerma* but differing in having the spikelets with sides of the glumes to the rhachis; panicle a spike 3-10 cm. long, 1-2 mm. diameter, usually curved, terminal and on lateral shoots and forming more than half of plant; spikelets slightly sunken; both glumes developed, equal, 5-7 mm. long, 5-nerved, apices sharp; lemma and palea membranous and shorter than glumes. European and Mediterranean species widely naturalised in temperate Australia. Occurrence in the A.C.T. not verified. 'Coast Barb Grass'. Fig. 53.

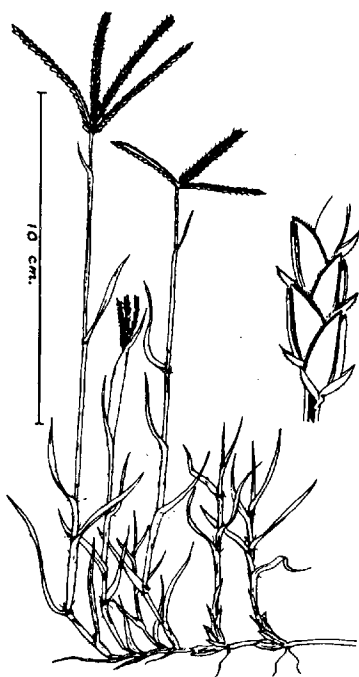
**P. incurva* (L.) C. E. Hubbard



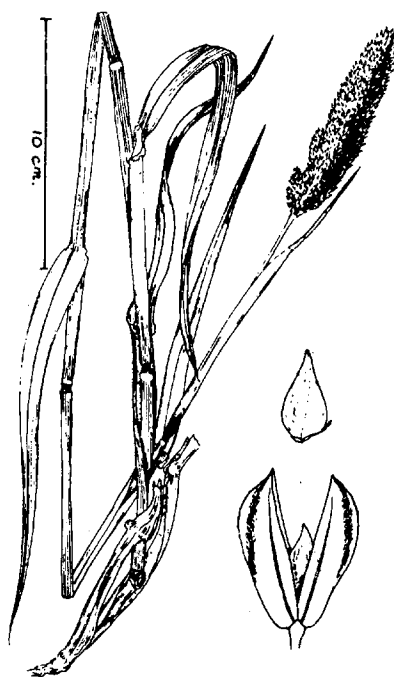
53. *Parapholis incurva*



54. *Chloris truncata*



55. *Cynodon dactylon*



56. *Phalaris aquatica*

Tribe: Chlorideae

45. CHLORIS Swartz

Glabrous perennial, culms ascendent, sheaths and blades conduplicate; panicle digitate with 6-9 stiff spreading branches; spikelets in 2 rows along underside of branches (when spread); glumes narrow, lower shorter than upper, both with scabrid keels; lemmas 2, both truncate, lower fertile, 3 mm. long, shortly ciliate on submarginal lateral nerves; upper smaller, glabrous; both with slender scabrid awns. Widespread in native pastures, sometimes persisting in lawns and gardens; all mainland States. 'Windmill Grass'. Fig. 54.

C. truncata R.Br.

46. CYNODON L.C. Rich.

Rhizomatous and stoloniferous perennial, leaves distichous, glabrous or with scanty hairs on top of sheath or on blades; panicle digitate, spikes 2-6, 2-5 cm. long; spikelets alternate along underside of spike rachis; glumes divergent, 1-1.5 mm. long, glabrous; lemma single, much longer than glumes, purplish or lead-grey except for white cilia up the keel; cilia along nerves of palea giving fringed appearance to floret. Cosmopolitan especially in warm temperate countries, common throughout Australia. Under A.C.T. conditions is cut back by frosts during winter. 'Couch Grass'. Fig. 55:

**C. dactylon* (L.) Pers.

Tribe: Phalarideae

47. PHALARIS L. See Anderson (1961)

1. Densely tufted glabrous perennial, culms 60-120 cm. high with bulbous swellings at base; leaves flat, often glaucous, membranous ligule 3-5 mm. long; panicle cylindroid, dense, 8-12 cm. long; spikelets flattened laterally, 5-7 mm. long; glumes keeled with broad wings in upper part; *fertile lemma with 2 minute sterile ones* attached at base, flattened-ovoid, hard, hairy when young, later glossy. Important grass widely used in southern and eastern Australia and Tasmania in established pastures, of Mediterranean origin. Persistent as a garden and roadside weed especially in the Turner and Dickson areas of Canberra. Anderson (1961) states that the commonly used name, *P. tuberosa* L. (1771) was based on an immature plant representing a species described in 1755. The earlier name is used here. 'Toowoomba Canary Grass'. Fig. 56.

1. **P. aquatica* L.

1a. Annual, less robust than preceding species; panicle 3-10 cm. long, oblong; spikelets 5-6 mm. long; glumes keeled above, *one sterile lemma present* at base of fertile, but bristle-like and almost as long as hairy fertile lemma. Of Mediterranean origin, occurs as a contaminant in pastures and as a local weed. 'Annual Canary Grass'.

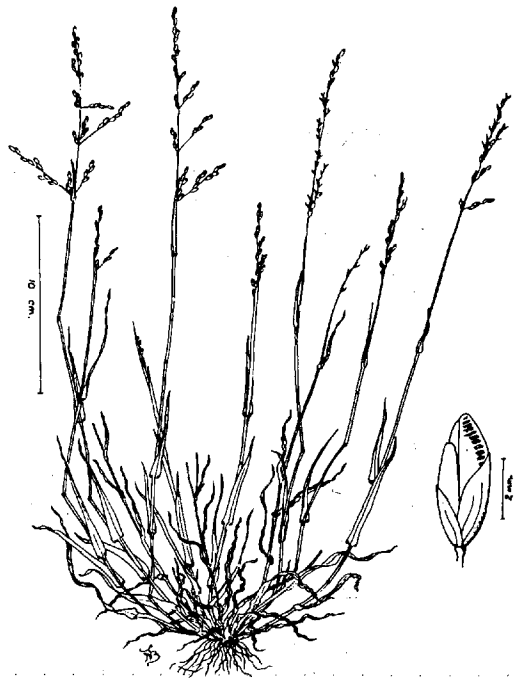
2. **P. minor* Retz.

48. MICROLAENA R.Br.

Sparse or diffuse rhizomatous perennial, culms decumbent at base, sheaths glabrous and smooth or rarely scabrid, sometimes with a few hairs at the orifice, ligule minute, blades scabrid or minutely pubescent, 3-6 cm. long, 3.5-4.5 mm. wide; panicle nodding, slender with capillary branches or subracemose, 10-15 cm. long; spikelets on filiform pedicels; glumes minute, below tuft of hairs on elongated rhachilla joint; 2 empty lemmas lanceolate to oblong, scabrid on nerves; terminal awn scabrid, about 1½ times as long as 4-8 mm. base; fertile lemma thin, shorter than sterile ones, obtuse and mucronate; stamens 4. Variable in size and growth habit of plants and size of spikelets. Common in temperate areas of all



57. *Microlaena stipoides*



58. *Ehrharta erecta*



59. *Hierochloa redolens*



60. *Anthoxanthum odoratum*

Australian States; occurs in shaded woodland or forest sites in the A.C.T. 'Weeping Grass'. Fig. 57.

M. stipoides (Labill.) R.Br.

49. EHRHARTA Thunb.

Slender perennials, culms ascendent from decumbent bases, glabrous or almost so; panicle erect, open, contracted or subracemose; spikelets about 4 mm. long, pedicellate; glumes thin, lower less than and upper more than $\frac{1}{2}$ as long as spikelet; 2 lower lemmas empty, hardened; upper longer, transversely corrugated above, with basal appendage; fertile lemma broadly elliptical, less hardened. Of South African origin, naturalised in scattered localities in southern Australia; established in Black Mountain area, A.C.T. 'Panic Veldt Grass'. Fig. 58.

**E. erecta* Lam.

50. HIEROCHLOE R.Br.

1. Tufted glabrous perennial 30-60 cm. high, leaves striate, ligule 4-5 mm. long, blades 4-6 mm. wide; panicle lax with nodding branches, 10-15 cm. long; spikelets shortly pedicellate, crowded towards ends of branches, gaping, 6-8 mm. long, pedicels sparsely villous; glumes thin, shining, *as long as or slightly longer than lemmas*; 2 lower lemmas staminate, scabrid or pubescent on back, margins ciliate, a short awn arising from upper third, thinly membranous, paleas thin; uppermost lemma fertile, unawned, slightly shorter than lower ones, pubescent above; panicle a characteristic leaden colour. In damp or swampy places at high elevations. Also in Australian Alps, Victoria, and Tasmania. 'Sweet Holy Grass'. Fig. 59.

1. *H. redolens* (Sol. ex Vahl)
Roem. et Schult. var. *redolens*

1a. Tufted perennial, culms more slender and trailing than in preceding, ligule 2 mm. long, blades 1.5-3 mm. wide and with hairlike apices; panicle lax, with few spikelets, 4-8 cm. long; spikelets gaping, on glabrous filiform pedicels; *glumes 3-4 mm. long, shorter than lemmas*, shining, glabrous, purplish or green tipped with colour, 3-5-nerved; 2 lower lemmas 5-6 mm. long, truncate or obtuse, unawned, glabrous or minutely scabridulous, minutely ciliolate on margins; upper floret bisexual with lemma 4-5 mm. long, smooth, not ciliolate. At high elevations in adjacent areas of New South Wales but not yet recorded for the A.C.T. 'Scented Holy Grass'.

2. *H. rariflora* J. D. Hook.

51. ANTHOXANTHUM L.

Stemmy tufted perennial, glabrous or almost so, ligule membranous; panicle narrow ovoid to oblong, 3-10 cm. long, green or golden-brown; spikelets crowded on short branches, flattened, 6-10 mm. long; glumes scarious, green nerves conspicuous, sparsely hairy, acute-acuminate; lower $\frac{1}{2}$ as long as upper which is 3-nerved, both longer than lemmas; 2 lowest lemmas empty, scarious, hairy, truncate or bilobed, lower with straight scabrid awn from middle of back, upper with longer geniculate awn attached near base; fertile lemma shorter, thin with golden anthers showing through. Native to Europe and Asia, occasionally found near cultivated areas or as a garden weed; naturalised throughout temperate Australia but rarely common. 'Sweet Vernal Grass'. Fig. 60.

**A. odoratum* L.

Tribe: Paniceae

52. PASPALUM L. See Vickery (1961)

1. Perennial summer-growing grass with culms to 1 metre or more high, glabrous except on panicle or villous on lower parts of basal sheaths, leaves angled along midrib, blades un-

dulate on margins; *panicle with a number of one-sided sessile racemes; spikelets crowded in 3-4 rows on underside of flattened-angular rhachis, 3-4 mm. long, ovate-orbicular, dorsally flattened; lower glume (exposed side) missing, upper glume (against rhachis) similar to empty lower lemma, lateral nerves distant from midrib and submarginal; upper lemma fertile, hard, almost orbicular, margins incurved over hard palea. A South American species widely naturalised in temperate and eastern Australia, commonly in alluvial soils near rivers and creeks. A troublesome weed in lawns and gardens. 'Paspalum'. Fig. 61.*

1. **P. dilatatum* Poir.

1a. Rhizomatous or stoloniferous perennial, rooting at nodes, sometimes floating in shallow water, leaves glabrous except at orifices; *panicle of 2 (rarely 3-4) flattened spikes 2-5 cm. long; spikelets in 2 rows, sessile or subsessile, oblong, 3-3.5 mm. long, dorsally flattened, lower glume absent or vestigial, upper glume equal to lower lemma, 3-nerved, appressed pubescent; empty lemma glabrous, fertile lemma smooth and glabrous. In damp or wet places, but sometimes a weed in lawns; found in all mainland States, widespread in warm temperate and tropical regions throughout the world, possibly native in Australia. 'Water Couch'.*

2. *P. distichum* L.

53. AXONOPUS Beauv. See Vickery (1961)

Weakly tufted or stoloniferous perennial (apparently short-lived in the A.C.T.), leaves glabrous or sparsely villous, blades conduplicate, apices obtuse; panicles commonly paired, a terminal one with 3 subdigitate spike-like racemes and a shorter one of paired racemes from uppermost axil; spikelets 2 mm. long, alternate on slender angular rhachis; lower glume (against rhachis) missing, upper glume and lower lemmas as long as spikelet, each lacking a central nerve; fertile lemma glabrous. Of American origin, more common in warmer coastal areas of eastern Australia; occasional lawn and garden weed in the A.C.T. 'Narrow-leaf Carpet Grass'. Fig. 62.

**A. affinis* A. Chase

54. DIGITARIA Heist. ex Fabric. See Vickery (1961)

1. Annual weeds of decumbent or ascendent habit.

2. Culms rooting at nodes, nodes villous (upper ones sparsely so), sheaths with tubercle-based hairs.

3. Panicle digitate or subdigitate with branches more or less 2-whorled; spikelets in pairs, unequally pedicellate, adpressed to rhachis, 3 mm. long; lower glume minute, upper about $\frac{1}{2}$ as long as lemmas; lower lemma 5-7-nerved, nerves minutely scabrid at least on upper part, glabrous on back on either side of central nerve, silky hairy between lateral pair of nerves and along margin especially on longer pedicelled spikelet (hairs at first appressed and obscure, later loose or spreading); fertile lemma hardened, narrow elliptical-lanceolate, apex submucronate. Troublesome summer weed in lawns, gardens, and waste areas, almost cosmopolitan especially in temperate regions. 'Crab Grass', 'Summer Grass'. Fig. 63.

1. **D. sanguinalis* (L.) Scop.

3a. Habit similar to that of above; differing in spikelets 3-5 mm. long, upper glume $\frac{1}{2}$ - $\frac{3}{4}$ as long as lemmas; lower lemma not scabrid on nerves, the hairs between the lateral nerves and between nerves and margin finally conspicuous and spreading (especially on longer-pedicelled spikelets); upper (fertile) lemma slender, elliptical, apex acuminate. Native to tropical areas of Central and South America but naturalised in many warm temperate and tropical regions including northern and eastern Australia. In the A.C.T. much less common than

the preceding, possibly introduced with horticultural material or in lawn seed mixtures from time to time and not long persistent.

2. **D. ciliaris* (Retz.) Koeler

2a. *Culms not rooting at nodes, nodes and sheaths glabrous or almost so*, more slender in habit than either of preceding species; panicle purplish, subdigitate, rhachis of racemes angular; *spikelets 2 mm. long*; lower glume minute, *upper almost as long as lower lemma* and like it clothed between the nerves with *minute club-tipped soft hairs*; fertile lemma dark and smooth when mature. Of Old World origin, now naturalised in many countries; occurs in New South Wales and Victoria and is a troublesome summer weed of lawns in the A.C.T. where the purple panicles mar the appearance. 'Smooth Crab Grass'.

3. **D. ischaemum* (Schreb.) Muhl.

1a. Tufted native *perennial*, commonly of erect habit, 20-50 cm. high, glabrous except for scattered hairs on leaf blades; panicle erect, of *few irregularly arranged racemes of silky hairy elliptical spikelets* in unequally pedicellate pairs; spikelets 2-3 mm. long, hairs often pinkish; lower glume minute and glabrous, upper glume and lower lemma with hairs between nerves, hairs appressed when young, spreading and woolly when old; fertile lemma shorter, hard, smooth and glabrous, apex sharp, margin folded over palea. Widespread in many parts of Australia, including the arid interior; not uncommon on stony slopes at low elevations in the A.C.T. 'Cotton Panic Grass'.

4. *D. brownii* (Roem. et Schult.)
Hughes

55. *ECHINOCHLOA* Beauv. *See Yabuno (1966)*

Coarse erect or ascendent summer annual, 50-80 cm. high, leaves glabrous, angular on midrib, ligule lacking; panicle more or less pyramidal above with alternate sessile racemes (branches) below; spikelets in 3-4 irregular rows (branches with sparse tubercle-based hairs), ovoid, plump, 3-3.5 mm. long, apices sharp; lower glume broad, $\frac{1}{2}$ as long as spikelet and clasping its base, acuminate to acute, 3-nerved; upper glume and lower lemma as long as spikelet, acuminate or awned, 5-nerved, nerves scabrid with minute bristles; upper lemma hard, smooth and shining, apiculate, margins curved over palea. Common summer weed in gardens and waste areas, especially where alluvial or well watered. Seedlings have red leaf sheaths. Of European origin but naturalised in many countries, found throughout temperate Australia. 'Barnyard Grass'. Fig. 64.

**E. crus-galli* (L.) Beauv.

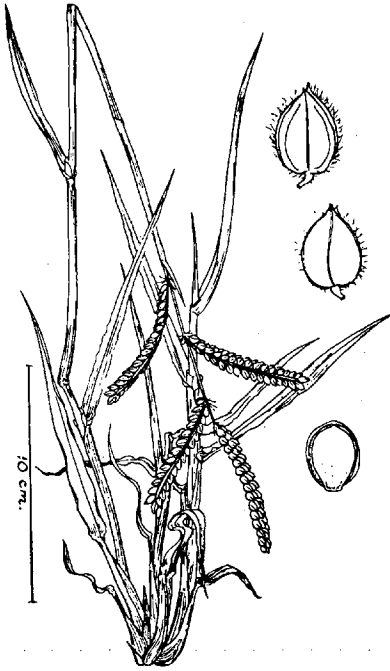
Note: Japanese Millet (*E. utilis* Ohwi et Yabuno) is occasionally found in the vicinity of Canberra. It differs in having a more robust and erect habit with the panicle less pyramidal, the more numerous racemes are shorter, often incurved and more or less appressed. The spikelets resemble those of *E. crus-galli* but are shorter (to 3 mm. long), more densely arranged and the fertile lemma is so broadly ovate-elliptical as to be almost as broad as long. This species has been cultivated for a long period and may have been developed by selection from a form of *E. crus-galli*.

56. *PANICUM* L.

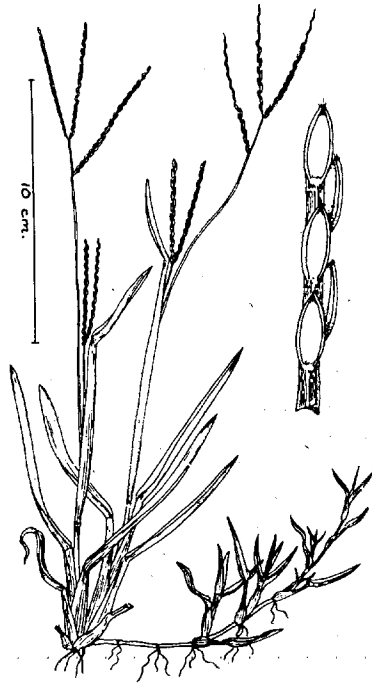
1. Tufted or coarse erect plants, leaves with stiff spreading hairs; panicle open with stiff divaricate branches when mature.

2. Spikelets 2-2.5 mm. long.

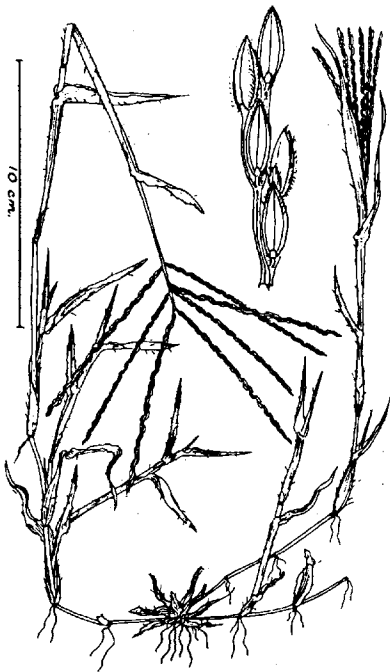
3. Tufted native *perennial* to 50 cm. high, nodes bearded, leaves with tubercle-based hairs; panicle branches erect when young; *spikelets in pairs towards ends of branches*, gaping, green or purplish; lower glume $\frac{1}{2}$ as long as spikelet, broadly ovate acuminate, 3-nerved; upper glume and empty lemma subequal, fertile lemma about $\frac{2}{3}$ as long, oblong, hard with



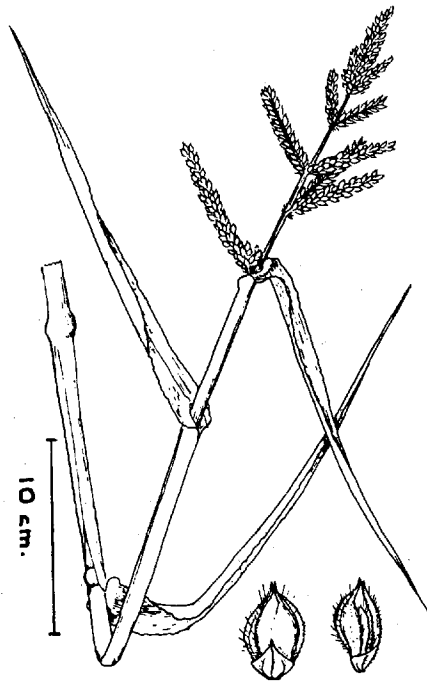
61. *Paspalum dilatatum*



62. *Axonopus affinis*



63. *Digitaria sanguinalis*



64. *Echinochloa crus-galli*

hard margins inrolled over margin of palea. Widespread native grass in native pastures and woodland, throughout southern Australia except South West Province of Western Australia. 'Hairy Panic Grass'. Fig. 65.

1. *P. effusum* R.Br.

3a. Annual weed similar in habit to preceding but more herbaceous, leaves hirsute with stiff tubercle-based hairs which are also present on stem below panicle; spikelets not paired towards ends of branches; lower glume barely $\frac{1}{2}$ as long as spikelet, upper glume and lower lemma 'pinched-in' to the narrow apices, shorter fertile lemma smooth and obtuse. North American species naturalised in Western Australia, Victoria, New South Wales and occurring locally as a summer weed. 'Witch Grass'.

2. **P. capillare* L.

2a. Erect annual, usually of robust habit, clothed with tubercle-based hairs especially on sheaths; panicle often dense though not much exerted, branches nodding with weight of spikelets which are 4-5.5 mm. long and shortly pedicellate towards the ends of the branches; lower glume more than $\frac{1}{2}$ as long as spikelet (to $\frac{3}{4}$), upper glume and empty lemma narrowed into linear apices 1-1.5 mm. longer than the glossy smooth hard fertile lemma. Native to temperate areas of Europe and Asia but cultivated in many countries. Occasionally appears as a casual where birdseed has been thrown out. 'Broom Millet'.

3. **P. miliaceum* L.

1a. Decumbent or ascendent glabrous plants; panicle partially enclosed in uppermost sheath, the slender branches erect or nodding; spikelets 2.5 mm. long, racemose on branches; lower glume $\frac{1}{2}$ length of spikelet; upper glume and lower lemma (which encloses membranous palea) with narrowed apices; fertile lemma smooth and shining, slightly shorter than lower one. Summer weed in gardens and on cultivated areas. Of African origin and highly variable in its native country. 'Sweet Panic Grass'.

4. **P. laevifolium* Hack.

57. ISACHNE R.Br.

Perennial with slender decumbent or ascendent culms, ligule ciliate, blades narrow lanceolate, scabrid; panicle open, not always fully exerted from uppermost sheath, 3-8 cm. long; spikelets pedicellate on flexuose branchlets, 2 mm. long, gaping; glumes as long as spikelet, concave, obtuse, scabrid near margins and apices; lower lemma with stamens, of similar texture to smaller fertile lemmas, margins of both incurved or inrolled but not tight around paleas. Widely distributed in eastern Australia, the Pacific area and Japan to south-eastern Asia, usually associated with damp habitats; occurs in Paddy's River and Tidbinbilla Valleys. 'Swamp Millet'. Fig. 66.

I. globosa (Thunb.) Kuntze

58. SETARIA Beauv. See Rominger (1962)

1. Bristles of the panicle antrorsely scabrid, i.e. rough when rubbed from the top.

2. Upper glume shorter than the rugulose fertile lemma.

3. Tufted perennial, 40-80 cm. high, leaves glabrous or minutely scabridulous; panicle narrow cylindrical, 4-5 mm. diameter, 5-10 cm. long; spikelets 2-2.5 mm. long, the bristles less than twice as long; lower glume $\frac{1}{2}$ as long as spikelet, upper slightly shorter than fertile lemma which is hard and finely rugulose. Native to tropical and South America, common around Canberra in summer and also naturalised in various parts of eastern Australia and Western Australia. 'Slender Pigeon Grass'. Fig. 67.

1. **S. geniculata* (Lam.) Beauv.
var. *pauciseta* Desv.

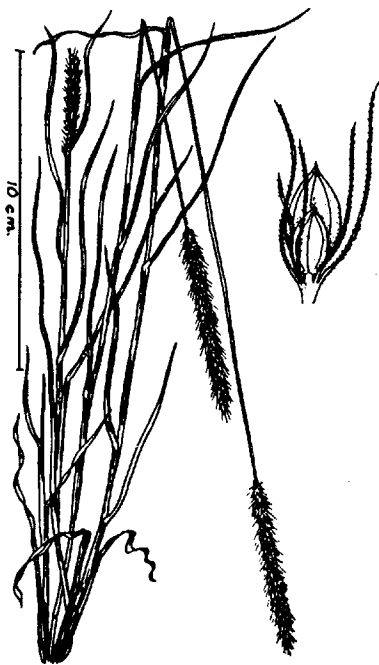
3a. Annual, sheaths with scanty hairs, blades villous-pubescent immediately above ciliate



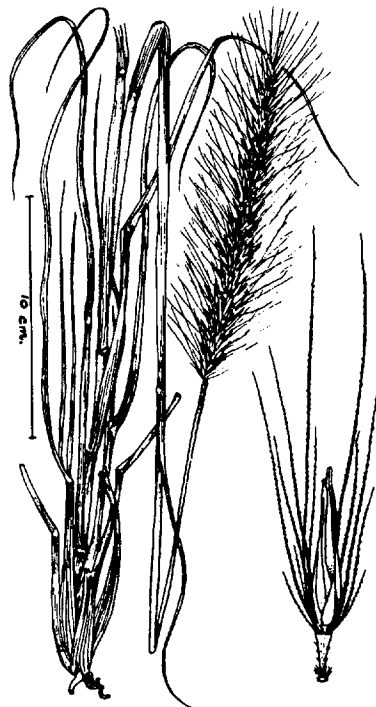
65. *Panicum effusum*



66. *Isachne globosa*



67. *Setaria geniculata* var.



68. *Pennisetum alopecuroides*

ligule; *panicle cylindrical-oblong, 6-12 mm. diameter, 4-10 cm. long; spikelets 2.5-3 mm. long; bristles 2-3 times as long, lower glume about $\frac{1}{2}$ as long as spikelet, upper glume only slightly longer than lower and exposing the rugulose fertile lemma.* Widespread in Australia and in many temperate and tropical countries; in Canberra it is common in the Ainslie area. 'Pale Pigeon Grass'.

2. **S. glauca* (L.) Beauv.

2a. Upper glume as long as the smooth or almost smooth fertile lemma.

4. Robust annual, leaves glabrous except for ciliate margins of sheaths or sheath also with scanty hairs near orifice; panicles cylindrical or irregularly so due to lobing, up to 3 cm. diameter; spikelets 2.5-3 mm. long, *fertile floret ("seed") loose and falling free from the upper glume and empty lemma*, smooth or obscurely and finely rugulose, glossy. Found in temperate areas of Europe and Asia and regarded as having originated from *S. viridis*. Naturalised in some localities in southern and eastern Australia. Occurrence in the vicinity of Canberra may be due to introduction in birdseed. 'Italian Millet'.

3. **S. italica* (L.) Beauv.

4a. Less robust in habit, panicle cylindrical, bristles purplish, mature fertile floret not falling free from upper glume and empty lemma. Local specimens are distinctive in having hirsute leaf sheaths, the hairs obscurely and minutely tubercled at their bases. A rare casual in the A.C.T.; native to warm temperate regions of the Old World, Asia and Indonesia, introduced to North and South America, New Zealand, New Guinea and all mainland States of Australia (except Western Australia).

4. **S. viridis* (L.) Beauv.

1a. Annual, habit similar to that of *S. glauca* but the panicle sometimes interrupted and more or less whorled at lower nodes, rhachis below panicle and *the bristles strongly retrorsely scabrid*; spikelets 2 mm. long, obtuse; fertile lemma more slender than in *S. glauca*, wrinkled-rugulose. The panicles often become tangled together or in clothing or wool. Widespread in warm and tropical areas of many countries including eastern Australia; becoming more common on waste ground in Canberra area. 'Whorled Pigeon Grass'.

5. **S. verticillata* (L.) Beauv.

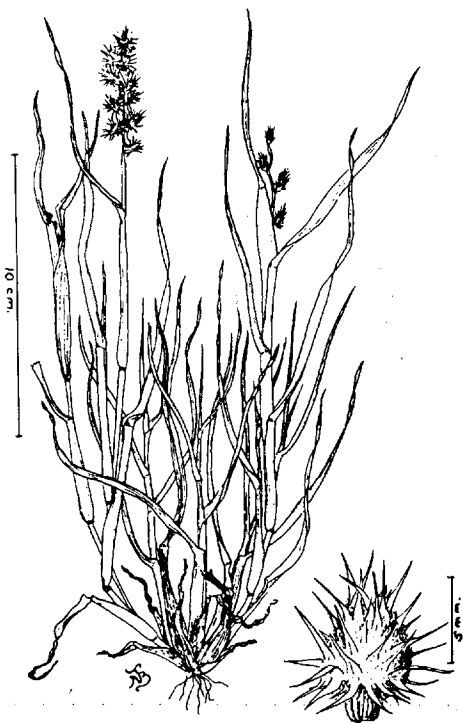
59. PENNISETUM L.C. Rich.

1. Densely tufted perennial to 1 metre high, sheath strongly keeled, blades long narrow and scabrid. *Panicle purplish, cylindrical, 10-15 cm. long*, rhachis below and in panicle softly villous with white hairs; spikelets shortly pedicellate, narrow linear-lanceolate, 7-8 mm. long, subtended by softly scabrid hairlike bristles some of which are twice as long; lower glume narrow, shorter than spikelet; upper glume and lower lemma lanceolate, fertile lemma thin and membranous. Widespread species extending from south-eastern Asia to Australia, occurring as native in eastern Australia; in the A.C.T. grows in damp places in disturbed forest or mountain gullies. 'Swamp Foxtail Grass'. Fig. 68.

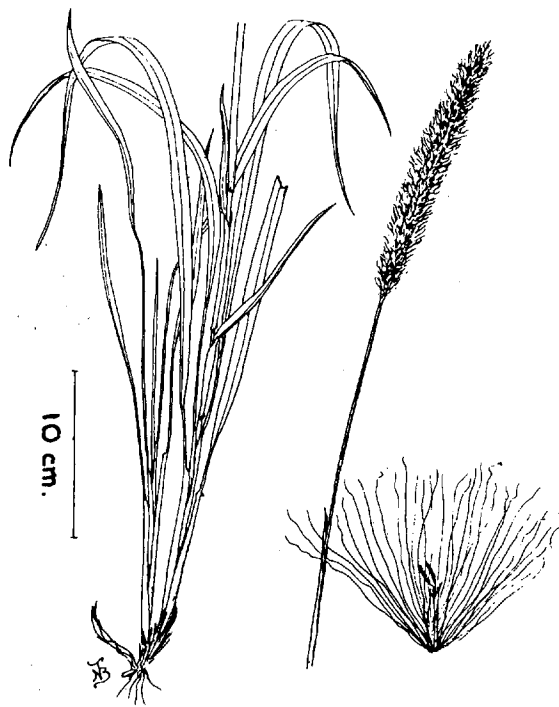
1. *P. alopecuroides* (L.) Spreng.

1a. Tussocky perennial with short culms and long leaf blades; *panicle pale, 5-8 cm. long, densely ovoid to shortly cylindrical*; spikelets 9-10 mm. long, callus-like pedicel densely villous, bristles plumose below, up to 4 times as long as spikelets; lower glume minute; upper $\frac{1}{2}$ as long as spikelet; lower lemma 8 mm. long, containing stamens; fertile lemma thin. Of North African and eastern Mediterranean origin, naturalised in many areas of southern Australia. Occasionally found near rivers or creeks, formerly common near Lennox Crossing from Acton peninsula and still common near Canberra Hospital; used to be grown as garden ornamental. 'Feather Grass'.

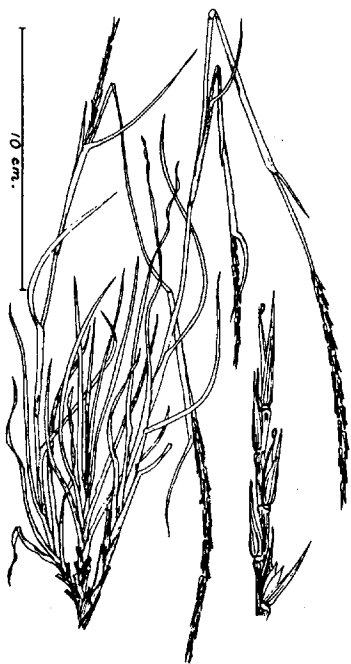
2. **P. villosum* R.Br.



69. *Cenchrus pauciflorus*



70. *Imperata cylindrica* var.



71. *Hemarthria uncinata*



72. *Themeda australis*

60. **CENCHRUS L.** See De Lisle (1963), Caro and Sanchez (1967a and b)

Ascendent annual (or overwintering?), culms 20-50 cm. high, nodes glabrous; sheaths compressed, ciliate or pilose towards orifice, ligule ciliate, blades conduplicate; panicle narrow, 2-8 cm. long, rhachis angular and flexuose; sessile burrs deciduous, more or less ovoid, sometimes purplish, pilose, enclosing 2-4 spikelets; spines minutely but retrorsely scabrid, basal series spreading or recurved, upper ones more or less spreading. Of American origin but now naturalised in South Africa and in scattered localities in Australia; rare in the A.C.T., the single record from the Cotter Reserve possibly due to a chance introduction which may not prove persistent. Referred to *C. incertus* M. A. Curtis by De Lisle but reinstated by Caro and Sanchez on basis of annual not perennial habit, keeled leaf blades and other characters. 'Spiny Burr Grass'. Fig. 69.

**C. pauciflorus* Benth.

Tribe: **Andropogoneae**

61. **IMPERATA** Cyr. See Hubbard et al. (1944)

Perennial sometimes of low habit but up to 80 cm. high, older sheaths splitting into fibres, blades flat or involute, strongly keeled, narrowed at orifice or with petiole-like base, ligule with hair tufts as on nodes; panicle erect, 10-12 cm. long; spikelets 3.5-4 mm. long, 1-flowered (rarely 2), hidden by numerous fine silky hairs from base and backs of glumes; panicles often with conspicuous purple anthers. Widespread from temperate and tropical Asia, east tropical Africa to Australia and south-west Pacific; uncommon in the A.C.T., recorded from Pine Island Reserve, Murrumbidgee River. 'Blady Grass'. Fig. 70.

I. cylindrica (L.) Beauv. var. *major*
(Nees) C. E. Hubbard

62. **HEMARTHRIA** R.Br.

Coarse sward-forming perennial, sheaths keeled on midrib, passing into blade without marked change, glabrous or with few hairs on margins of sheaths; panicle on erect culm, a narrow spike whose spikelets have their pedicel partly fused to the adjacent joint of the rhachis; spikelets adpressed to and partly sunken in rhachis; glumes 7-10 mm. long, one with back against rhachis, the other green, striate, narrow lanceolate, apices sometimes hooked; lemma and palea membranous, shorter than glumes. Common on river and creek banks or in swampy gullies in the mountains. Widespread in similar habitats throughout temperate Australia and Tasmania. 'Mat Grass'. Fig. 71.

H. uncinata R.Br. var. *uncinata*

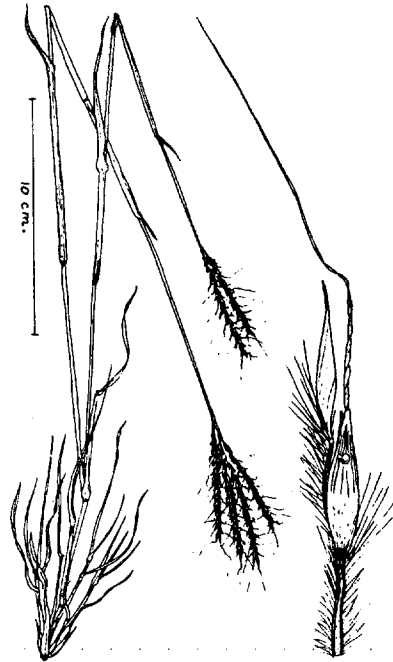
63. **THEMEDA** Forsk. See Hayman (1960)

Tufted perennial with tall stiff culms to over 1 metre high, leaves keeled along midrib; panicle complex, lower branches axillary to culm leaves, upper in axils of leafy bracts; spikelets in bracteate clusters which are themselves bracteate; each cluster consists of a basal whorl of 4 sterile sessile spikelets reduced to their glumes and surrounding a triplet of 2 pedicellate sterile spikelets and a larger fertile spikelet; glumes of sterile spikelets dull and pale brownish, glumes of fertile spikelet dark brown and glossy, horny above the sharp callus which is clothed with silky brown hairs; lemmas membranous, lower empty, upper with 4-6 cm. long awn twisted in its lower length. Throughout Australia; a variable species, the chromosome races are discussed by Hayman (1960), in A.C.T. material is diploid ($2n = 20$). 'Kangaroo Grass'. Fig. 72.

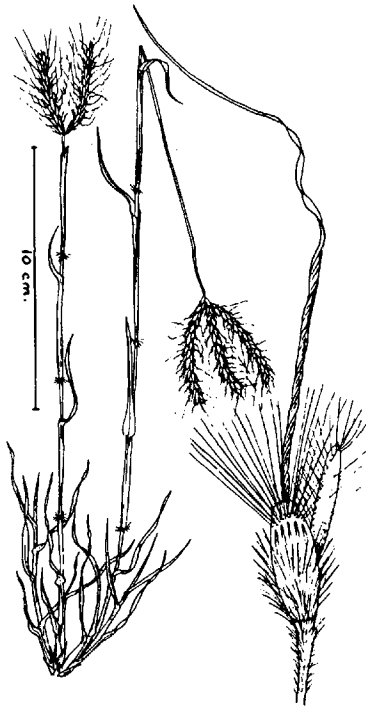
T. australis (R.Br.) Stapf



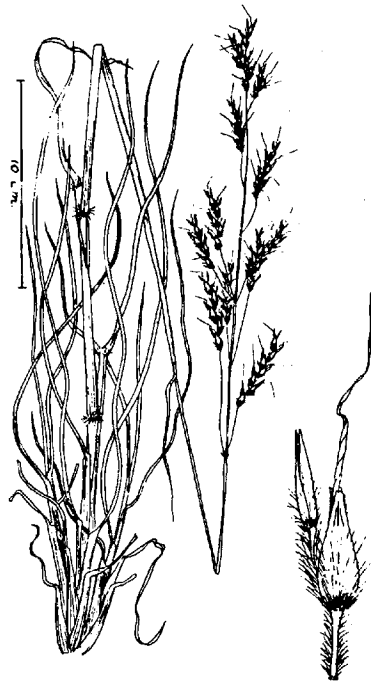
73. *Cymbopogon refractus*



74. *Bothriochloa macra*



75. *Dichanthium sericeus*



76. *Sorghum leiocladum*

64. **CYMBOPOGON** Spreng. See Blake (1944)

Culms wiry, much longer than tufted basal leaves which are aromatic when crushed, 30-80 cm. high; panicle of bracteate clusters of paired racemes digitate on slender peduncles from the axils of the culm leaves or of leafy bracts; racemes 1.5-2 cm. long, reflexed when mature, rhachis fragile and jointed; sessile spikelets fertile, lower glume glabrous but appearing fringed as it lies against the hairy rhachis joint; fertile lemma with slender twisted awn; pedicellate spikelets smaller and awnless. On rocky slopes and shallow soils in woodland or dry forest habitats along Murrumbidgee and Molonglo Valleys; widespread in eastern Australia from tropical northern areas south to eastern Victoria. 'Barbed-Wire Grass'. Fig. 73.

C. *refractus* (R.Br.) A. Camus

65. **BOTHRIOCHLOA** Kuntze See Blake (1944), Vickery (1961)

Perennial with slender culms 30-50 cm. high, leaves keeled on midrib; panicle often purplish or dark coloured, of 1-3 digitate or subdigitate spikelike racemes, rhachis of raceme jointed, each joint with horny margins and thin translucent tissue between; spikelets paired; sessile ones fertile, lower glumes appearing fringed by spreading hairs of rhachis but with short hairs on lower $\frac{1}{2}$ of back, sometimes with conspicuous pit in upper $\frac{1}{3}$, awn of fertile lemma twisted, geniculate, about 3-4 times as long as spikelet; pedicellate spikelets sterile and reduced. Widespread in eastern Australia, rare in South Australia, usually increasing in abundance where native pastures are overgrazed. 'Red Grass', 'Redleg Grass'. Fig. 74.

B. *macra* (Steud.) S. T. Blake

66. **DICHANTHIUM** Willemet. See Blake (1944), Vickery (1961)

Similar to above but more often tussocky 30-60 cm. high; panicle not turning purplish, of 2-4 silky-hairy spikes 3-5 cm. long and digitate or subdigitate on rhachis; joints of raceme rhachis slender and stiff, without line of thin tissue up the centre; sessile spikelets fertile, glumes 3.5-4.5 mm. long, partly obscured by straight hairs and with a long series in a subapical arc below the obtuse apex, fertile lemma with twisted awn at least 4 times as long as spikelet; pedicellate spikelets male or sterile, unawned. Widespread in eastern and also in arid areas of Australian mainland; to be found in native pastures on Southern Tablelands of New South Wales and the A.C.T. though never abundant. 'Queensland Blue Grass'. Fig. 75.

D. *sericeum* (R.Br.) A. Camus

67. **SORGHUM** Moench

1. Tussocky perennial, *not rhizomatous*, culms bearded at the nodes, sheath ciliate, pubescent near orifice, ligule scarious, blades narrow, much longer than sheaths; panicle open, lax, nodding when mature, branches bare at base; spikelets racemose, rhachis and glumes of sessile and pedicellate spikelets clothed with *silky dark brown hairs*; sessile spikelets obtuse at base, glumes 6-8 mm. long, lanceolate-ovate, glabrous above, fertile lemma with twisted awn 1-2 cm. long; pedicellate spikelets 5-6 mm. long, empty or with stamens, lemma unawned. Stony slopes and shallow soils of Murrumbidgee and Molonglo Valleys, in woodland and dry forest habitats; widespread in eastern Australia; introduced in India. 'Wild Sorghum'. Fig. 76.

1. S. *leiocladum* (Hack.) C. E. Hubbard

1a. *Rhizomatous perennial*, lower culms rooted at *pubescent lower nodes*, leaves glabrous except near orifices, blades keeled by prominent midrib; panicle open or contracted, branches bare at base; spikelets racemose and loosely seriate; sessile spikelets glossy, *shortly* villous with pale hairs; glumes 4.5-5.5 mm. long, nervate above; fertile lemma with or without

awn, if present awn less than 1.5 cm. long; pedicellate spikelets lanceolate, often staminate, not glossy. Pedicels and joints of rhachis shortly villous. Mediterranean species introduced for fodder purposes, now naturalised in many areas of Australia, usually grows in damp sites; a rare casual in the A.C.T. 'Johnson Grass'.

2. **S. halepense* (L.) Pers.

CYPERACEAE

1. Female flowers and nut enclosed in a utricle; all flowers unisexual.

1. *Carex* (p. 74)

1a. Nut not enclosed in a utricle; flowers mostly bisexual, sometimes the uppermost or lowermost male only.

2. Spikelets more or less flattened, the glumes distichous or if the spikelet 1-flowered and the glumes reduced to 2 (in *Cyperus brevifolius*) then the style bifid; hypogynous bristles absent and the spikelets are usually numerous in a dense head.

3. Rhachilla more or less straight; spikelets several- to many-flowered, or if 1-flowered then the style bifid; hypogynous bristles absent.

2. *Cyperus* (p. 76)

3a. Rhachilla strongly flexuose and bent over the nut or nuts; spikelets few-flowered, style trifid; hypogynous bristles present or absent.

3. *Schoenus* (p. 80)

2a. Spikelets more or less terete, the glumes spirally arranged or if the spikelets are 1-flowered and the glumes reduced to 2 (in *Oreobolus*) then the style trifid, hypogynous bristles present and the spikelets nearly always solitary and terminal on the culm.

4. Each spikelet maturing more than 3 nuts.

5. Style slender throughout its length, not thickened at the base.

4. *Scirpus* (p. 80)

5a. Style thickened at the base.

6. Spikelet single and terminal on the culm; leaves reduced to sheaths; style articulate above the thickened base which remains attached to the nut.

5. *Eleocharis* (p. 85)

6a. Inflorescence compound and leaves developed (in A.C.T. species); style articulate below the thickened base which does not remain attached to the nut, hypogynous bristles absent.

6. *Fimbristylis* (p. 86)

4a. Each spikelet maturing only one nut (rarely two).

7. Hypogynous bristles or scales absent.

8. Style not thickened at the base; bracts of the inflorescence tightly inrolled, narrow stiff and scabrid, at least the lower much exceeding the group of spikelets in their axils; very coarse caespitose plants growing in large clumps.

7. *Gahnia* (p. 86)

8a. Style base thickened; bracts of the inflorescence more or less flat or slightly incurved, soft and glabrous, not or scarcely exceeding the group of spikelets in their axils; more or less slender plants with long-creeping rhizomes.

8. *Machaerina* (p. 88)

7a. Hypogynous scales present.

9. Hypogynous scales thick and slightly fleshy, attached to the base of the nut and falling with it; glumes persistent; coarse tufted plants more than 15 cm. high with compound inflorescence.

9. *Lepidosperma* (p. 88)

9a. Hypogynous scales more or less scarious, remaining attached to the apex of the

culm after the nut has fallen; glumes deciduous; small plants less than 10 cm. high with usually simple inflorescence.

10. *Oreobolus* (p. 90)

1. *CAREX* L. See *Nelmes* (1944)

1. *Spike solitary and terminal on the culm*, up to 1 cm. long, the male portion above the female and usually as long or longer than it; utricles at length spreading, strongly nerved, sometimes minutely red-flecked, $1.9-2.4 \times \pm 1.0$ mm., shortly exceeding the pale castaneous obtuse glumes; style branches 3; slender perennial with shortly-creeping rhizomes, culms usually exceeding the leaves, above 0.5 mm. diameter, usually less than 20 cm. high but up to 50 cm. in shelter of shrubs. Gibraltar Creek area (about 3800 ft), in swamp; Mt Murray, sphagnum swamp near summit; also mountainous areas of eastern New South Wales and Victoria, New Zealand, New Guinea, Celebes, Philippines, Japan, China, and India.

1. *C. capillacea* Boott

1a. Spikes more than 1 on each culm.

2. *Style branches 3*; utricles \pm trigonous or swollen.

3. *Spikes 1-several at the nodes of the culm*, mature female spikes (4-) 5-8 mm. diameter, the lowermost drooping on long slender peduncles longer than the spikes; upper 1-4 spikes predominantly male; utricles to 6 mm. long including the conspicuous long slightly incurved beak which is about 2 mm. long, glabrous except setulose on the margins above, strongly nerved on the abaxial faces and much exceeding the glumes; glumes of the female flowers yellow-castaneous with wide hyaline margins, $5.7.5 \times 2.5.4$ mm., the strong midnerve usually produced into a short awn; coarse caespitose perennial with short ascending tough woody rhizomes, forming large clumps, base of the culms covered with the fibrous remains of old leaf sheaths. Condor Creek, also Naas and Gudgenby areas; usually in rocky outcrops on the margins of creeks and rivers; also Southern Tablelands of New South Wales, Victoria and Tasmania. This species is closely allied to the coastal *C. longibrachiata* Boeck. ('Bergalia Tussock'), and might best be regarded as a subspecies of it.

2. *C. lynx* Nelmes

3a. *Spikes solitary at the nodes of the culm*.

4. *Body of utricles puberulent*, swollen about the middle and tapering to both ends at maturity, strongly nerved, $2.4-3.8 \times 1.2-1.5$ mm., shorter than or subequal to the subtending glumes; female glumes with scarious sides, the prominent green midrib often produced into a distinct awn up to 2 mm. long; usually tufted perennial with short slender woody rhizomes, culms very variable in length but usually shorter than the leaves and often only 2-5 cm. high, the base of the culms covered with the brown fibrous remains of old leaf sheaths. Widespread throughout the A.C.T. at all altitudes; all States except Western Australia; also New Zealand, Lord Howe Island, New Guinea, and Celebes.

3. *C. breviculmis* R.Br.

4a. *Body of utricles glabrous* (sometimes scabrid on the beak or margins towards the apex).

5. Utricles $5-6 \times 2$ mm., strongly nerved and becoming divergent at maturity, *abruptly narrowed at the base into a distinct stipes 0.6-1 mm. long*; *beak of utricule (including the 1.0-1.6 mm. long teeth) subequal in length to the swollen body*; glumes aristate, subequal in length to the utricles; terminal spike usually male (occasionally partly female); female spikes 3-7, about 1 cm. diameter, the lowermost \pm drooping on long slender peduncles; leaves bright green, minutely septate-nodulose between the veins, 5-10 mm. wide, with antrorsely scabrid cutting edges; coarse tufted perennial to 1 metre high with triquetrous culms and long leafy bracts exceeding the inflorescence. Swamps and margins of streams at low and intermediate altitudes, usually overhanging the water e.g. Five Fords, Coree Creek

etc.; also all States except Northern Territory; New Zealand, New Guinea. This species is related to *C. pseudocyperus* L. of the northern hemisphere.

4. *C. fascicularis* Sol. ex Boott

5a. Utricles not markedly stipitate, the beak distinctly shorter than the body of the utricle.

6. Utricles at length swollen and corky, $4\text{-}6 \times 1\text{-}5\text{-}2\text{-}5$ mm. strongly nerved, becoming smooth with age, teeth slightly divergent, $0\text{-}6\text{-}0\text{-}8$ mm. long, minutely scabrid especially on the inner margin; glumes mostly shorter than the utricles, the margins at length castaneous or reddish castaneous, the pale or greenish midrib produced into a short antrorsely scabrid awn; culms shorter than the leaves which are narrow, attenuate and circinnate at the apex; female spikes crowded towards the basal part of the culms; very strongly rhizomatous and tending to form dense stands. Swamp between Lyneham and Gungahlin on Barton Highway; along the Murrumbidgee River; Doughboy Creek behind Mt Ainslie; Molonglo River at Burbong etc.; very common in mud or sand, usually in the vicinity of rivers, lakes, and swampy areas at low elevations. This inland form of the species differs from the coastal form in the conspicuously scabrid inner margins of the utricle teeth, the more consistently awned glumes and the generally narrower leaves with more attenuate and conspicuously circinnate apices; it might be best regarded as a subspecies. The species is found in eastern and south-eastern Australia, Lord Howe Island, New Zealand, Chile, China, Japan, and Korea.

5. *C. pumila* Thunb.

6a. Utricles subequally trigonous in cross section, at length slightly swollen but never corky, $3\text{-}4\text{-}3\text{-}8 \times 1\text{-}4\text{-}2\text{-}0$ mm., finely nerved except for a strong nerve along the lateral margins; glumes subequal to or shorter than the utricles, the prominent midnerve produced into a short antrorsely scabrid awn $0\text{-}5\text{-}1\text{-}5$ mm. long; mature female spikes 6-8 mm. diameter, mostly distant from the base on the long culms; the terminal spike usually male, occasionally partly female; perennial with ascending rhizomes which are often long and creeping through sphagnum moss, leaves 4-6 mm. wide, not circinnate at the apex; culms triquetrous, 30-60 cm. high, normally longer than the leaves. Mt Ginini, Snowy Flats (Mt Gingera), Mt Bimberi, near summit, in or near sphagnum bogs at high elevations, often growing with *C. gaudichaudiana*; also Kosciusko region of New South Wales and the Victorian Alps.

6. *C. blakei* Nelmes

2a. Style branches 2; utricles \pm plano-convex or slightly swollen.

7. Terminal spike or spikes wholly male, spikes \pm elongated, distant in the axils of leafy bracts.

8. Utricles $3\text{-}2\text{-}4 \times 1\text{-}2\text{-}1\text{-}6$ mm., strongly nerved on both faces, ovate, gradually narrowed to the beak; glumes of the terminal male spike usually obtuse, oblong, elliptic or obovate; longest female spikes less than 6 cm. long; leaves narrow, 2-4 mm. wide; tufted perennial to 80 cm. high with shortly-creeping rhizomes; the culms often shorter at higher altitudes. Fairly common at all altitudes, sandy or muddy banks of creeks and rivers, and swampy flats or sphagnum bogs at high elevations. Fig. 77.

7. *C. gaudichaudiana* Kunth

8a. Utricles faintly nerved, usually almost nerveless on the adaxial face, broadly ovate or broadly elliptical and \pm abruptly narrowed and obtuse below the beak, sometimes reddish-brown at maturity; glumes of the terminal male spike acute, linear to narrow-triangular; longest female spikes more than 7 cm. long (up to 17 cm. long); leaves broad, 4-9 mm. wide; coarse tufted perennial with \pm woody ascending rhizomes, culms to 1 metre high, forming large clumps in sand, gravel or mud at the waters edge. Cotter River below Cotter Dam, Five Fords, Lee's Creek, Gudgenby River; also Queensland, New South Wales, and Victoria.

8. *C. polyantha* F. Muell.

7a. *Terminal spike bisexual*, spikes short, clustered towards the apex of the culm, or numerous in a spike-like panicle.

9. *Spikes male at the base* (often wholly female in appearance at maturity).

10. *Glumes pale or greenish on the sides; utricles strongly nerved*; spikes 2-5, 0.5-1 cm. long, clustered at the apex of the culm and subtended by one to several involucre bracts of which at least one is usually longer than the inflorescence; perennial, culms usually less than 40 cm. high, tufted or with shortly-creeping rhizomes. Common at low altitudes throughout the A.C.T., in Eucalypt woodland or grassland, swampy areas or on sandy creek banks.

9. *C. inversa* R.Br.

10a. Similar to the above especially when immature but *sides of the glumes chestnut-brown at maturity with whitish hyaline margins; utricles weakly nerved*, and rhizomes often more creeping. Brumby Flats near Mt Gingera, about 5700 ft, Mt Murray, high altitudes under *Eucalyptus pauciflora* and in alpine woodland.

10. *C. hebes* Nelmes

9a. *Spikes male at the top.*

11. *Spikes less than 10, arranged in a short terminal inflorescence less than 3 cm. long*; utricles veinless, with narrow serrulate margins; perennial with slender culms usually less than 30 cm. high arising at intervals along the long-creeping rhizomes; leaves soft and usually shorter than the culms. Tidbinbilla, entrance to Gudgenby station, on grassy flats near river.

11. *C. chlorantha* R.Br.

11a. *Spikes numerous, in a long spike-like panicle usually more than 3 cm. long*; robust coarsely tufted perennials with ascending rhizomes, the culms usually more than 40 cm. high.

12. *Culms hard, triangular in cross section, ± scabrid*; leaves numerous broad ± flat and well-developed, scabrid with cutting edges; female glumes with castaneous sides, sometimes with a relatively inconspicuous narrow hyaline border; inflorescence 5-25 cm. long; coarse densely tufted perennial with woody rhizomes, and culms to 1 metre or more high, but smaller in all its parts at higher altitudes. Widespread and fairly common at all altitudes, and dominant in many swampy areas at intermediate altitudes; margins of rivers, creeks, lakes, and swampy areas.

12. *C. appressa* R.Br.

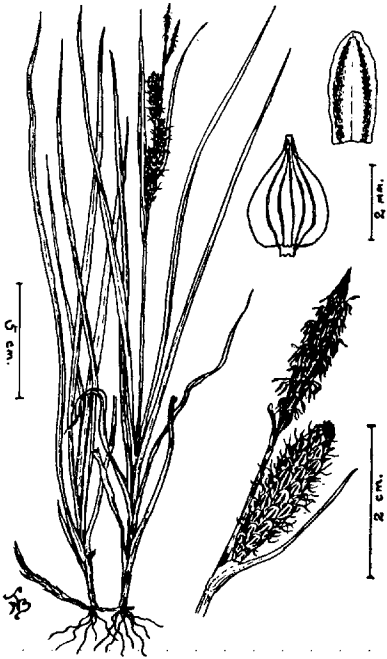
12a. Similar to the preceding but *culms smooth, terete for most of their length, almost hollow or filled with very soft pith* and more finely striate; leaves often rudimentary or reduced to their sheaths, sometimes laminae well-developed but these are relatively inconspicuous among the numerous culms; female glumes with a conspicuous wide hyaline border; inflorescence usually short and dense, mostly less than 10 cm. long; often in large clumps up to 1 metre diameter at base. Restricted to low altitudes in the A.C.T. e.g. Tharwa, Tidbinbilla area, and common around Lake George (N.S.W.); usually in low areas subject to occasional flooding.

13. *C. tereticaulis* F. Muell.

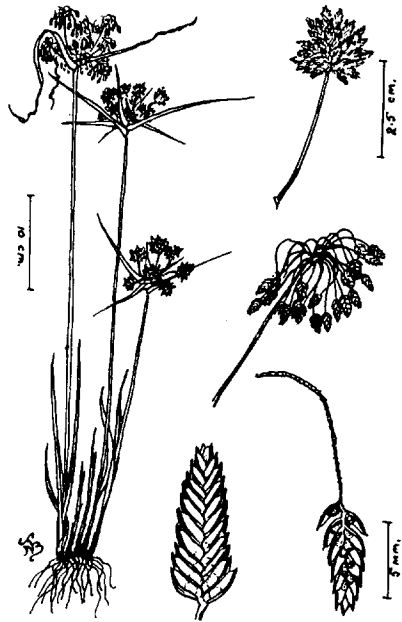
2. CYPERUS L.

1. *Style branches 2; nut lenticular or plano-convex in cross section.*

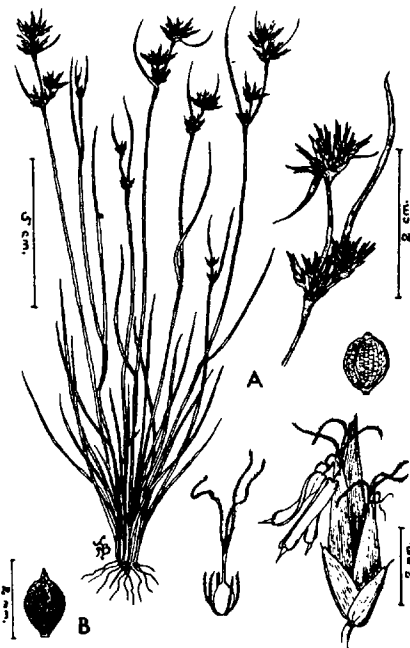
2. *Spikelets 1-flowered ± sessile in a single ± globose capitate cluster subtended by 2-4 leafy involucre bracts; glumes overlapping, pale green or yellowish-brown and hyaline*; perennial with long-creeping branched rhizomes and slender 3-angled culms usually less than 30 cm. high, often dwarfed at higher altitudes and on dry sites. Widespread and fairly common in the A.C.T. at low and intermediate altitudes; Canberra environs, shores of



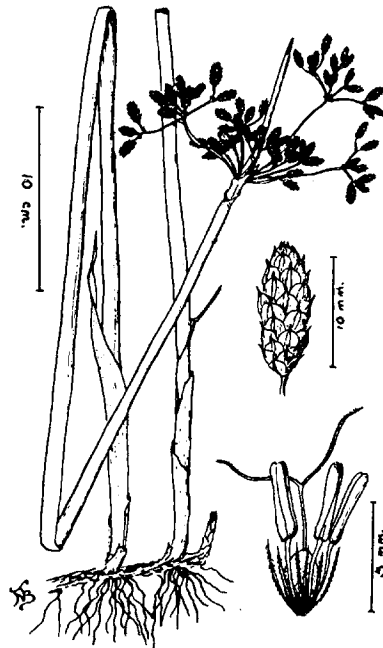
77. *Carex gaudichaudiana*



78. *Cyperus eragrostis*



79. *Schoenus apogon*



80. *Scirpus validus*

Lake Burley Griffin, Booroomba, lower slopes of Mt Tennent, Tidbinbilla Creek, margins of lakes, rivers etc., and seepage areas in grassland. Range: Pantropic.

1. *C. brevifolius* (Rottb.) Hassk.

2a. *Spikelets 5-many-flowered* loosely arranged in capitate and/or pedunculate clusters (occasionally reduced to 1 spikelet in dwarfed specimens), subtended by 2-4 leafy involucre bracts; *glumes distichous, stained dark reddish-purple or black especially along the upper margins*; nut lenticular (very rarely a trigonous nut in the lowermost floret) with an edge against the rhachis, broadly obovate, red-brown or dark brown usually with a thin \pm glistening whitish epicarp; tufted annual sometimes with short ascending rhizomes, culms 3-angled, often becoming weak and flaccid in larger plants, occasionally more than 40 cm. high, sometimes dwarfed to about 2 cm. high. Canberra area including shores of Lake Burley Griffin, Tidbinbilla Creek, Fitz's Hill on upper slopes and south to Boboyan, Naas, and Gudgenby River etc.; all States except Tasmania, also Africa, southern and central Asia, Indonesia, and New Guinea.

2. *C. sanguinolentus* Vahl

1a. *Style branches 3*; nut \pm trigonous.

3. *Involucral bract 1*, filiform except slightly expanded at the base, appearing as a continuation of the stem, less than 1.5 cm. long; glumes 1.2-1.5 mm. long, pale green usually stained red-brown on the sides; nut narrowly ovate or narrow elliptical in outline, acutely triquetrous with concave sides, pale and \pm shining, 0.8-1.0 \times 0.5-0.6 mm.; *spikelets flattened, 1-4 sessile on the culm in a single apparently lateral cluster*; small tufted annual less than 15 cm. high with filiform stems and leaves. Lower slopes of Black Mountain, wet areas in grassland and near margins of lakes and lagoons at low altitudes, e.g. Lake George and Rose's Lagoon (N.S.W.); also temperate Australia, New Zealand, and South Africa.

3. *C. tenellus* L.f.

3a. *Involucral bracts more than one*, \pm leaf-like and spreading; *spikelets numerous in a compound inflorescence*; usually robust annuals or perennials.

4. *Glumes more than 1 mm. long*.

5. *Spikelets reddish-purple, deep reddish-brown or brown, rarely maturing nuts, arranged in groups of less than 10 on the ends of the primary rays of the inflorescence*; rhachilla prominently winged; *rhizomes thin wiry and long creeping, bearing small ellipsoid naked or fibre-coated tubers* which give rise to new culms; perennial 15-30 (-50) cm. high with grass-like leaves which are usually shorter than the 3-angled culms. Canberra environs, including shores of Lake Burley Griffin, Molonglo River; weed in gardens and waste places; Queensland to Victoria and South Australia; a cosmopolitan weed, probably indigenous in Australia but introduced in the A.C.T. 'Nut Grass'.

4. *C. rotundus* L.

5a. *Spikelets numerous (usually many more than 10) in simple or compound clusters on the primary rays*, if occasionally less than 10 (in depauperate specimens) then *tubers absent from rhizomes and/or spikelets commonly maturing nuts*.

6. *Rhachis with broad hyaline wings which are distinctly wider than the width of the rhachis*; *spikelets usually less than 8-flowered, articulate at the base and readily deciduous as a whole at maturity*, bright red when young, turning red-brown or brown with age, arranged in clusters which are often longer than wide, at the ends of the primary rays of the inflorescence; nut \pm 2.5 \times 0.7 mm., narrow oblong or narrow obovate, dark brown at maturity; usually robust tufted perennials with thick woody ascending rhizomes and 3-angled culms 30-150 (-180) cm. high; leaves and bracts often \pm 1 (-1.5) cm. wide, usually with antrorsely scabrid cutting edges and minutely septate-nodulose on the undersides. Along the margins of creeks and rivers at or near the water's edge; Cotter River, Five Fords, Brindabella road, and

nearby areas, Coree Creek, Lee's Creek; also Queensland, New South Wales, Victoria, Tasmania, and New Guinea.

5. *C. lucidus* R.Br.

6a. *Rhachis unwinged or with narrow hyaline wings which are not or scarcely wider than the rhachis; spikelets more than 8-flowered, ± persistent, the rhachis sometimes very tardily deciduous as a whole at maturity, or persisting and the glumes falling separately from the base up.*

7. *Spikelets pale or yellowish-green, very numerous; stamen 1; glumes spreading, 2.0-2.2 mm. long, the margins ± infolded distally; nut pale brown, shortly stipitate, subequally trigonous ± 1.0 × 0.6 mm., about ½ the length of the glume; pale green ± tufted perennial with short thick rhizomes and soft 3-angled culms which are often slightly swollen in the basal third and usually 30-60 cm. high; leaves and bracts minutely septate-nodulose on the underside and ± 0.6 mm. wide. Canberra area and environs, e.g. Sullivan's Creek, shores of Lake Burley Griffin, very common on the banks of lakes, small creeks, and small ponds at low altitudes; temperate eastern Australia but native to America, now a widespread weed. 'Umbrella Sedge'. Fig. 78.*

6. **C. eragrostis* Lam.

7a. *Spikelets in shades of red or brown; stamens 3.*

8. *Spikelets brown or red-brown, flat, the glumes distichous, 1.4-1.6 mm. long; nut pale and shining when ripe, subequally trigonous, 0.4-0.6 mm. long and ± as wide, about ½ the length of the glume; graceful perennial with slender leaves and culms, usually less than 60 cm. high, tufted or with an ascending or shortly-creeping woody rhizome; Canberra area, swampy area with *Phragmites* etc., not common; also Queensland, New South Wales, and Victoria.*

7. *C. concinnus* R.Br.

8a. *Glumes more than 1.8 mm. long; nut more than ½ the length of the glumes, much longer than wide.*

9. *Graceful perennial to 75 cm. high, tufted or usually with thin shortly-creeping woody rhizomes; spikelets red-brown or light red, congested in subglobular clusters 1-3 cm. diameter at the ends of the primary rays of the inflorescence; glumes 3.3-8 mm. long, the pale or greenish midrib produced into a short mucronate point; nut narrow-oblong or narrowly obovate ± 2.2 × 0.6 mm. about ¾ the length of the glumes, yellow or yellowish-brown; underside of leaves and involucre bracts not or only very obscurely septate-nodulose, leaf sheaths sometimes stained with red, the base of the culms often covered with the fibrous remains of old sheaths; occasional in wet or swampy areas on the margins of lakes, creeks and rivers etc.; low altitudes; Canberra area, e.g. Sullivan's Creek, Tharwa area, Naas area, shores of Lake George (N.S.W.).*

8. *C. rutilans* (C. B. Clarke)

Maiden et Betche

9a. *Usually robust tufted perennial with ± thick woody ascending rhizomes, the culms stout, 3-angled, usually 2-5 mm. wide and over 60 cm. high; spikelets brown or red-brown, forming compound subglobular clusters at the ends of the primary rays of the inflorescence; glumes 2.0-2.8 mm. long, subobtusate at the apex or sometimes the midrib produced into a minute mucro; nut pale, about ¾ to about as long as the glume, oblong-lanceolate 1.8-2.2 × ± 0.6 mm.; leaves, involucre bracts and sometimes the culms conspicuously septate-nodulose (when dry), the lowest involucre bract usually very long (30-100 cm.). Molonglo River, Murrumbidgee River near Cotter Pumping Station, Kambah Pool, occasional on*

the banks of rivers and creeks at low altitudes; also Queensland to Tasmania and South Australia. 'Flecked Sedge'.

9. *C. gunnii* J. D. Hook.

4a. Tufted annual to 75 cm. high with soft green culms; spikelets dark brown or pale green, very numerous in dense subglobular clusters which are usually 1-2 cm. diameter; *glumes cucullate*, ± 0.6 mm. long and about as wide, the central portion pale or greenish, the sides \pm stained with red-brown or dark reddish-purple; nut pale, subequally triquetrous with \pm flat sides, obovate or broadly elliptic in outline, $\pm 0.6 \times 0.4$ mm., the surface minutely granular. Base of Black Mountain, swampy area in grassland, occasional at low altitudes; widespread in tropical and warm regions of the world.

10. *C. difformis* L.

3. **SCHOENUS** L.

1. Variable tufted or shortly rhizomatous *perennial* usually to about 25 cm. high with \pm *filiform culms, leaves and bracts*, the latter with red or reddish-black sheaths; culms usually with 1-3 nodes below the inflorescence; spikelets red-brown or black, $\pm 4-7$ mm. long, subsessile or pedicellate in often dense clusters in the axils of the bracts or in a single subterminal cluster; nut white, $\pm 1.0 \times 0.8$ mm., obtusely trigonous with very convex sides and *smooth scarcely raised ribs*, inflated and almost globose when ripe, the surface variably reticulate or almost smooth; *hypogynous bristles about as long as the nut*, minutely antrorsely scabrid, some usually remaining attached to the rachis after nut has fallen. Widespread and common at low and intermediate altitudes; wet soakage areas in grasslands, swampy areas, near creeks; also Queensland to Tasmania and South Australia, New Zealand, Malaysia, and Japan. Fig. 79A.

1. *S. apogon* Roem. et Schult.

1a. Pale green *lax annual* 10-25 cm. high with flat *grass-like leaves and bracts* which usually have pale sheaths; culms without nodes below the inflorescence; spikelets pale or occasionally the glumes reddish on the sides, 0.9-1.2 cm. long, subsessile or pedicellate in clusters of usually 1-3 in the axils of the leafy bracts; *nut (including the ribs) coarsely alveolate* (under 10x lens), $1.5-2.0 \times 0.8-1.0$ mm., pale becoming minutely dark-spotted or fuscous and \pm shining at maturity, subequally trigonous with convex sides and raised ribs in cross section, broadly oblong or elliptical in outline, rather abruptly constricted to the prominent base; *hypogynous bristles minute or absent*. Long Gully Lane near Canberra, western foot of Black Mountain, wet soakage areas in grassland, locally common at low altitudes; also New South Wales, Victoria, South Australia and Tasmania (rare). Fig. 79B (nut only).

2. *S. latelaminatus* Kükenth.

4. **SCIRPUS** L. See Blake (1942, 1943)

Note: The length of the nut is total length (including beak), the width of the culms is measured about half way along the culm.

1. *Hypogynous bristles present*, or if deciduous then the culms more than 30 cm. high and/or more than 1 mm. wide; robust erect perennials.

Group 1

1a. *Hypogynous bristles absent*; culms usually less than 30 cm. long (except much elongated when floating in the water), and less than 1 mm. wide; slender annuals or perennials.

Group 2

Group 1

1. *Hypogynous bristles weak and filiform, at length much folded and contorted, when straightened, 2 to more than 3 times as long as the nut*, sparsely minutely antrorsely scabrid

at least distally; spikelets numerous, about $7\text{-}8 \times 2\text{-}3$ mm., dark olive-green becoming brownish at maturity; glumes obtuse, glabrous, the lateral nerves conspicuous, the mid-nerve not produced into an awn; nut plano-convex or with a distinct dorsal angle, $1\text{-}2\text{-}1\text{-}4 \times 0\text{-}6\text{-}0\text{-}8$ mm., pale or yellowish; stamens 3, anthers $1\text{-}2\text{-}1\text{-}4$ mm. long; style branches 3; robust leafy perennial usually growing in clumps 30-60 cm. across at the base and 1-2 metres high. Rendezvous Creek, Gudgenby area, Naas Creek, Boboyan-Gudgenby area, margins of creeks and rivers in wet mud or sand or in swampy ground at intermediate altitudes; also Queensland (Wyberba), New South Wales (Tablelands) and eastern Victoria. 'Large-head Club-rush'.

1. *S. polystachyus* F. Muell.

1a. *Hypogynous bristles firm and rigid, shorter than or subequal in length to the nut, retrorsely scabrid.*

2. *Leaves reduced to sheaths or the uppermost sheath sometimes with a rudimentary lamina much shorter than the sheath; spikelets reddish-brown or brown, up to 1.3 cm. long and about 0.5 cm. wide, numerous in a loose compound inflorescence which is usually longer than the erect involucre bract; glumes 3.3-5 mm. long, notched at the apex, the strong mid-nerve produced into a short awn within the notch; nut obovate, plano-convex or biconvex, dark brown at maturity, $2\text{-}5\text{-}3 \times 1\text{-}5\text{-}1\text{-}8$ mm.; stamens 3; anthers $1\text{-}8\text{-}2\text{-}2$ mm. long; hypogynous bristles conspicuously retrorsely barbellate, shorter than, subequal to or slightly longer than the nut; style branches 2; rhizomatous perennial with soft cylindrical culms commonly 1-2 metres high or more. Molonglo River, Sullivan's Creek, Canberra, shores of Lake Burley Griffin, Murrumbidgee River, often forming dense stands on the margins of rivers, creeks, and dams; common at low altitudes. 'River Club-rush'. Fig. 80.*

2. *S. validus* Vahl

Note: This plant might best be treated as a subspecies of the widespread *S. lacustris* L. See Koyama (1962).

2a. *Leaves usually well-developed, the laminae longer than the sheaths, or if not then the culms distinctly 3-angled.*

3. *Involucre bract 1, erect and appearing to be a continuation of the culm (occasionally smaller inconspicuous bracts present which are shorter than the spikelets); spikelets sessile on the culm, reddish-brown to dark brown; glumes notched at the apex, more or less fimbriate on the margins above, the strong mid-nerve produced into a short awn within the notch; nut obovoid, lenticular or with a very obtuse dorsal angle, strongly beaked, at length dark chestnut-brown, $3\text{-}2\text{-}3\text{-}7 \times 1\text{-}8\text{-}2\text{-}2$ mm.; hypogynous bristles 5-6, retrorsely barbellate, shorter than or subequal to the nut; anthers $2\text{-}5\text{-}3$ mm. long; style branches 3; perennial with a strong almost woody rhizome, culms hard, 3-angled, usually less than 60 cm. high, leaves shorter than the culms. Near R.A.A.F. Wireless Station (Barton Highway, Canberra), Kambah to Tharwa road, Murrumbidgee River near Kambah Pool and at Point Hut Crossing, sandy banks of rivers or creeks or clayey soils near roadside drains, swamps; locally common at low altitudes. 'American Club-rush'.*

3. *S. americanus* Pers.

Note: The *S. americanus* group has been revised by Beetle (1943) and by Koyama (1963). Koyama proposes the name *S. americanus* Pers. subsp. *monophyllus* (Presl) Koyama var. *monophyllus* for the representative found in Australia, Tasmania, and New Zealand.

3a. *Two or more involucre bracts conspicuous, flattened and more or less spreading, similar in texture to the leaves; globose ± woody tubers usually present on the rhizomes.*

4. *Style branches 2; nut compressed, usually with a depression on each face, broadly obovate or almost turbinate in outline, golden-yellow to deep golden-brown, $3\text{-}6\text{-}4\text{-}4 \times 2\text{-}2\text{-}2\text{-}8$ mm. conspicuously beaked; hypogynous bristles retrorsely scabrid, 2-6, readily caducous, about*

half as long as the nut; spikelets clustered on short rays, golden-brown, $1.7-2.3 \times 0.7-1.2$ cm.; glumes minutely pubescent with short antrorse hairs, the margins hyaline, usually notched or erose at the apex, the strong mid-nerve produced into a conspicuous slightly recurved awn about 2 mm. long; stamens 3, anthers $4.0-4.4$ mm. long; rhizomatous leafy perennial with culms usually about 60 cm. high, the rhizomes usually bearing globose fibrous tubers up to 2.5 cm. in diameter. Shores of Lake Burley Griffin, Barton Highway between Lyneham and Gungahlin, small stagnant brackish swamp near road; usually in about 9-12 in. of water with the rhizomes in black anaerobic mud; also south-eastern Australia and New Zealand. See Beetle (1942); Koyama (1962); Cook (1947).

4. *S. caldwelii* V. J. Cook

4a. Rather similar to *S. caldwelii* in general appearance, with similar globose tubers, but usually taller, darker green and more leafy, the inflorescence less contracted with some rays up to 10 cm. long; nuts shining, brown or reddish-brown becoming almost black at maturity, *the majority of nuts tristigmatic, subequally trigonous in cross section*, the abaxial sides concave between the very obtuse angles, narrowly or broadly obovate in outline, strongly beaked, $3.6-4.2 \times 2.0-2.5$ mm.; hypogynous bristles usually 6, retrorsely scabrid, moderately caducous, about $\frac{1}{2}-\frac{3}{4}$ the length of the nut; sometimes a minority of nuts in the spikelets are distigmatic and plano-convex in cross section. Along Molonglo and Murrumbidgee rivers, shores of Lake Burley Griffin, fairly common along rivers and creeks at low altitudes, usually growing in running water up to about 1 ft deep but sometimes in non-brackish stagnant pools, in sand or gravelly mud which is black and anaerobic at depth; also south-eastern Australia and New Zealand. See references for *S. caldwelii*.

5. *S. medianus* V. J. Cook

Group 2

1. *Style branches 2, spikelet solitary and terminal*; aquatic or semi-aquatic perennials, stems leafy at the nodes and much elongated when floating in the water.

2. *Spikelet broadly ovate, stout, 5-8 mm. long and 3-5 mm. wide*, green sometimes tinged with purple; nut obovate, oval or oblong, lenticular and smooth, grey, whitish or pale brown, $1.4-2.0 \times 0.8-1.4$ mm., *the margin slightly thickened*; stamens 3; leaves sometimes with a single node towards the apex. Brindabella Range, at high altitudes e.g. Snowy Flats, (Mt Gingera), Mt Ginini bog, Corin Dam road near Gibraltar Creek, swamps and sphagnum bogs, in mud on margins of creeks and small ponds and often sending long floating stems into the water; also New South Wales, Victoria, Tasmania, New Zealand, and New Guinea. 'Alpine Club-rush'.

6. *S. crassiusculus* (J. D. Hook.)
Benth.

2a. *Spikelet lanceolate or narrow oblong, 3-5 m. long and less than 2.5 mm. wide*, green or purple-tinged; nut obovate (sometimes slightly asymmetrical) lenticular and smooth, brown or whitish, $1.6-1.8 \times 1.0$ mm., *the margin not thickened*; stamens 2-3; slender floating leafy perennial sometimes with very small tuberous swellings at junction of culm and rhizome; the spikelets protrude above the water at anthesis. Molonglo River, Burbong, about 2 miles beyond Upper Cotter Ranger's Hut towards Yaouk Gap; usually forming dense masses in still or running water, sometimes emerged on muddy banks; low and intermediate altitudes, streams, rivers and nearby ponds; also temperate Australia, Tasmania, New Zealand, Africa, and Eurasia. 'Floating Club-rush'.

7. *S. fluitans* L.

1a. *Style branches 3, or if sometimes 2 then spikelets not solitary*.

3. *Stamens normally 3* (rarely less in the upper part of some spikelets).

4. *Nut globose, shortly stipitate, with 10-12 conspicuous longitudinal striations and numerous*

fine transverse bars forming narrow-oblong trabeculae, whitish opalescent becoming shiny brown or black at maturity, $0.6-0.7 \times 0.4-0.45$ mm.; glumes with conspicuous green midrib, 1.1-1.5 mm. long, the sides finely nerved, hyaline or stained with red; spikelets 1-2, up to 3.5 mm. long; small tufted annual rarely to 15 cm. high, stems setaceous, leaf sheaths tinged with red, the blades usually short or absent, occasionally well-developed in luxuriant specimens. Common and widespread at low and intermediate altitudes; Hall area, Canberra area and environs, Kowen area, Tharwa area, Fitz's Hill, Booroomba; wet depressions and soakage areas in grassland, wet mud and sand on margins of swamps and river banks; also Queensland, New South Wales, Victoria, South Australia, Western Australia, and Tasmania.

8. *S. hookeranus* (Boeck.) S. T. Blake

4a. *Nut not as above, the external cells either not conspicuous or more or less isodiametric.*

5. *Glumes very obtuse at the apex, not strongly keeled, the keel not or scarcely produced or spreading but more or less appressed distally; spikelet not angular*, broadly ovoid, usually solitary and very oblique; nut brown or black, compressed trigonous, with an obscure dorsal rib, the dorsal angle very obtuse, $0.8-0.9 \times 0.6-0.7$ mm., the external cells minute; tufted or shortly rhizomatous, usually less than 15 cm. high, leaf blades usually rudimentary or occasionally well-developed, the sheaths reddish. Canberra area and environs, Ginninderra Experiment Station, Queanbeyan area; sparsely distributed but locally common at low altitudes, wet muddy pond or stream banks, or saline soakage, or swamp areas; all Australian States, almost cosmopolitan. See note under *S. platycarpus*.

9. *S. cernuus* Vahl

5a. *Glumes strongly keeled, the keel shortly produced or spreading at the apex; spikelets angular.*

6. Nut finally grey, *compressed trigonous with a distinct dorsal rib*, $1.1-1.3 \times 0.6-0.9$ mm., the external cells extremely minute; *spikelet 1, sub-erect, partly enfolded by the dilated base of the erect floral bract*, pale green or dark purple; keel of the glumes distinctly mucronate at the apex; stamens 3; perennial with well-developed leaves and floral bract and *slender long-creeping branched rhizomes*. Mt Ginini swamp, edge of sphagnum, high altitudes; also New South Wales, Victoria, Tasmania, New Zealand, and New Guinea.

10. *S. aucklandicus* (J. D. Hook.) Boeck.

6a. Nut yellow, orange or brown, *subequally trigonous with flat or convex sides, the dorsal angle acute or obtuse but not ribbed; spikelets 1-6, well exerted; tufted annuals.*

7. Glumes 1.3-2 mm. long, *the sides indurated, stiff and shining*, strongly nerved, yellowish becoming deeply stained with dark red distally; *spikelets 1-6, very angular; nut broadly elliptic subequally trigonous with acute or obtuse angles, the sides almost flat and minutely granular*, yellow, orange or finally dark red-brown at maturity, $0.6-1.3 \times 0.4-0.8$ mm., with a very short and thick pale or dark reddish fleshy stipes at the base; stamens 0.2-0.3 mm. long; small densely tufted annual usually less than 8 cm. high, leaves usually well-developed, shorter than the stems, the sheaths reddish. Black Mountain around the base and lower slopes; wet mud in and around small depressions, grassy flats in dry sclerophyll forest and disturbed ground; locally common but rather sparsely distributed, at low altitudes; also New South Wales, Victoria, South Australia, Western Australia, New Zealand, temperate South America and South Africa.

11. *S. antarcticus* L.

7a. Glumes 1.2-1.5 mm. long, *the sides membranous*, strongly nerved, the mid-nerve shortly produced and slightly spreading at the apex; *spikelets 1-2, not conspicuously angular; nut*

suborbicular or broadly obovate, very shortly stipitate or sessile, $0.7-0.8 \times 0.6-0.7$ mm., whitish opalescent, brown or almost black and glistening at maturity, *the side adjacent to the axis nearly flat, the others convex, the dorsal angle obtuse or rounded, not ribbed at maturity, the external cells coarse, hexagonal*; small usually tufted annual with setaceous stems, leaves rudimentary or well-developed. Grassland at foot of Black Mountain, near top of Fitz's Hill, Lake George (N.S.W.); wet depressions in grassland or cleared sclerophyll forest, often found growing in colonies of *S. hookeranus*, and very similar to the latter species in general appearance; not common, low and intermediate altitudes; also New South Wales, Victoria, South Australia, Western Australia, Tasmania, and New Zealand. Sometimes difficult to distinguish from *S. cernuus*, but the plants are usually smaller, with spikelets often paired (nearly always solitary in *S. cernuus*), and the glistening mature nut is more rounded on the back, unribbed, with much coarser external cells.

12. *S. platycarpus* S. T. Blake

3a. *Stamen 1 per floret* (occasionally 2-3 in the lowermost florets).

8. *Plants with well-developed ascending or long-creeping rhizomes*, usually forming rather dense cushion-like or turf-like areas (occasionally in *S. subtilissimus* stems much elongated and floating in the water).

9. *Glumes* $0.8-1.2 \times 0.6-0.8$ mm., the sides conspicuously nerved and usually \pm stained with red, usually sub-obtuse or emarginate (occasionally acute) at the apex; nuts pale or yellowish-brown, subequally trigonous or slightly asymmetrical, with distinct angles and slightly convex sides, distinctly beaked and abruptly narrowed to a short base, $0.7-1.0 \times 0.5-0.8$ mm., external cells minute, usually subequal to or shortly exceeding the glumes; *anther* $0.25-0.5$ mm. long; spikelets 1-3 (occasionally proliferous in wet habitats and in aquatic forms); usually short plants with well-developed leaves, culms filiform, longer or shorter than the leaves, rhizomes slender $0.5-1.0$ mm. diameter, long-creeping. Very common at intermediate and high altitudes but less common at lower altitudes, Mt Bimberi, Brindabella Range, Snowy Flats (Mt Gingera), Lee's Springs, Bendora Dam, Hurdle Creek, Tidbinbilla Valley, Gudgenby River, western foot of Black Mountain; swampy areas, wet depressions in grassland and wet banks of creeks, rivers etc.; an aquatic form is often found floating in small \pm stagnant pools; this has extremely elongated and attenuated culms which develop from proliferating spikelets; also Queensland to Tasmania, New Zealand, New Guinea, and the Philippines.

13. *S. subtilissimus* (Boeck.) S. T. Blake

9a. Similar in general appearance to forms of *S. subtilissimus* which have the leaves and bracts longer than the culms, but spikelets larger, *glumes* $1.5-2.2 \times 1.2-1.3$ mm.; *nut* $1.0-1.25 \times 0.7-0.9$ mm.; *anther* $0.6-1.2$ mm. long; grows in dense pale green often cushion-like patches; Mt Ginini, in disturbed sphagnum bog, high altitudes; also New South Wales and Victorian Alps.

14. *S. montivagus* S. T. Blake

8a. Not as above; *tufted plants*, sometimes \pm branched at the base but *rhizomes not well-developed*.

10. *Sides of the glumes hyaline and nerveless*, glumes about 1.0 mm. long; spikelets 2-3 mm. long, sometimes tinged with red or reddish-purple; nut trigonous, ± 0.6 mm. long, usually very pale orange when ripe; tufted annual with numerous spreading filiform culms. Foot of Black Mountain, wet depressions in grassland; once collected; also from Queensland to Victoria and South Australia.

15. *S. australiensis* (Maiden et Betché) S. T. Blake

10a. *Sides of the glumes conspicuously nerved.*

11. Glumes 1.2-1.8 mm. long, *the sides stained or flecked with red or dark reddish-purple, the midrib not swollen distally*; nut pale or yellowish, 0.8-1.2 × 0.6-0.8 mm., broadly obovate or elliptic in outline; anther 0.6-0.8 mm. long; *leaves usually with rudimentary laminae and red-stained sheaths*; inflorescence often proliferous, the culms then arching over or falling, thus allowing the plantlets to take root. Canberra area and Gudgenby area; low altitudes, not very common; all States except Western Australia, and New Zealand.

16a. *S. inundatus* (R.Br.) Poir.
var. *inundatus*

11a. Close to the above but differing mainly as follows: spikelets often more numerous; glumes 1.2-1.8 mm. long, *pale green, the midrib becoming ± swollen and spongy distally*; nut 0.6-1.0 × 0.5-0.7 mm., the external cells smaller than in the var. *inundatus*; anther 0.2-0.4 mm. long; *uppermost leaves usually with well-developed laminae, the sheaths never stained with red*; culms often shorter and more spreading, but becoming more robust with proliferating spikelets in very wet sites; fairly common but sparsely distributed at all altitudes; Canberra area, Black Mountain, Booroomba, Brindabella Range, Snowy Flats (Mt Gingera), Bendora Dam; wet sandy or muddy banks of rivers, creeks, pools, wet run-off and soakage areas or depressions in grassland and forests, and muddy depressions in upland bogs and swamps; also eastern New South Wales and eastern Victoria.

16b. *S. inundatus* (R.Br.) Poir.
var. *floribundus* Benth.

5. ELEOCHARIS R.Br. See Blake (1939)

Note: The measurement of the length of the nut does not include the attached style-base; the diameter of the culm is measured half way along the culm.

1. *Rhizomes well-developed, tuber-bearing stolons absent; mature spikelets usually forming well-developed nuts, not proliferous*; if spikelets are more than 12 mm. long then orifice of the uppermost leaf sheath thickened, truncate and prominently mucronate.

2. Nut pale and often shining, obscurely 3-angled in cross section, 0.7-1.1 × 0.4-0.6 mm., *vertically ribbed and finely transversely trabeculate, hypogynous bristles small or absent*; orifice of the uppermost leaf sheath hyaline and oblique, not mucronate, often loose and somewhat inflated; style base small, $\frac{1}{3}$ to $\frac{1}{2}$ as wide as the nut; culms ± 0.5 mm. wide, to 25 cm. long but often less than 10 cm. and almost capillary; spikelets pale or chestnut-brown, 2-7 mm. long. Sparsely distributed at low elevations in swampy ground subject to periodic inundation; vicinity of Canberra and Tharwa; also Queensland, New South Wales, Victoria, South Australia, Tasmania, and New Zealand. 'Small Spike-rush'.

1. *E. pusilla* R.Br.

2a. *Nut usually more than 1.2 mm. long and more than 0.8 mm. wide, without vertical ribs (except the ribbed dorsal angle in E. gracilis) hypogynous bristles conspicuous; orifice of the uppermost leaf sheath thickened, oblique or truncate.*

3. Nut yellowish-brown or brown, *distinctly trigonous in cross section, the dorsal angle ribbed, 1.2-1.3 × 0.8-0.9 mm.*; mature spikelets red-brown to brown, *less than 12 mm. long (mostly 5-9 × 2-2.5 mm.)*. Glumes readily deciduous at maturity; culms less than 0.8 mm. wide and usually less than 20 cm. high; uppermost leaf sheath slightly thickened and oblique at orifice, *rarely mucronate*. In swampy areas and wet run-off areas near swamps and creeks, fairly common at intermediate altitudes, sparsely distributed at low altitudes; Coree Flats near A.C.T./N.S.W. border, Cotter Valley, Brindabella Range, Booroomba,

Gudgenby; also Queensland, New South Wales, Victoria, South Australia, New Zealand, and Norfolk Is. 'Slender Spike-rush'.

2. *E. gracilis* R.Br.

3a. Nut without a dorsal angle; culms usually robust, more than 1 mm. wide; uppermost leaf sheath truncate and mucronate at orifice.

4. Nut yellow to brown, plano-convex to biconvex in cross section, \pm turgid, without a dorsal angle, $1.4-1.8 \times 1.0-1.4$ mm.; mature spikelets red-brown to dark brown, commonly more than 12 mm. long and more than 3 mm. wide, the glumes persistent; culms terete, usually robust, 1-3 mm. wide and often more than 30 cm. high; uppermost leaf sheath thickened, truncate and mucronate at orifice. Very common at low altitudes in swampy areas, river banks, ditches; Canberra and environs, Naas, Gudgenby River; also Queensland, New South Wales, Victoria, South Australia, Western Australia, Tasmania, New Zealand and Norfolk Is. 'Common Spike-rush'. Fig. 81.

3. *E. acuta* R.Br.

4a. Very close to the preceding but culms strongly flattened, sometimes as wide as or wider than the spikelet which is pallid or brownish; style base often very hispidulous in the lower portion; this plant (in the A.C.T.) also produces many sterile culms which are often wider than the fertile ones. To date only known in the A.C.T. from the margin of Lake Burley Griffin on the western shore of Black Mountain Peninsula; also Queensland and New South Wales (Chromosome number $2n = 40$: B.G. Briggs, unpublished).

4. *E. plana* S. T. Blake

1a. Plants with thin stolons (less than 1 mm. diameter) bearing small pale ovoid tubers; mature spikelets (10-) 12-20 mm. long, reddish or red-brown (less commonly chestnut-brown) rarely forming mature nuts, often proliferous; mature nut (rarely found) pale and shining, $1.3-1.5 \times 0.6-0.7$ mm., vertically ribbed and transversely trabeculate (the vertical ribs often visible under high power in the small immature nuts); style base pyramidal-deltoid, more than $\frac{1}{2}$ as wide as the mature nut; culms 0.5-0.7 mm. wide; orifice of the uppermost leaf sheath membranous, hyaline and oblique, not mucronate; the culms often arch over and the proliferous spikelet buds take root. In seepage areas in grassland or in open swampy areas at low altitudes, Black Mountain, Pierce's Creek Forest, Tharwa, Hall; also southern Queensland and New South Wales. 'Tuber Spike-rush'.

5. *E. atricha* R.Br.

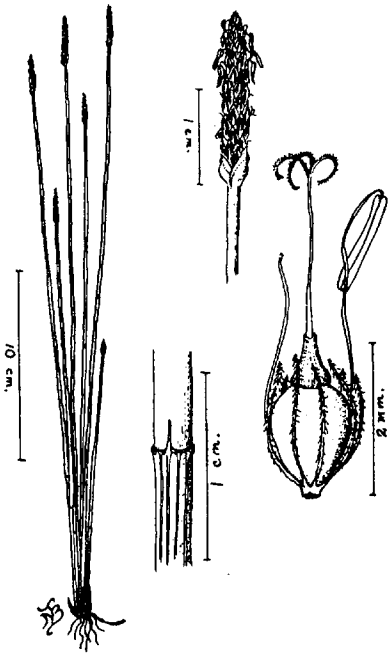
6. *FIMBRISTYLIS* Vahl

Slender tufted perennial to 40 cm. high; leaves basal, filiform, shorter than the culms; spikelets reddish-brown, ovate in outline becoming \pm subglobose, $4-6 \times 2.5-4$ mm.; style branches 2, style ciliate distally on the margins, the swollen base glabrous; nut obovate in outline, whitish with conspicuous longitudinal ribs and numerous fine transverse bars; hypogynous bristles absent. Lower slopes Mt Tennent; low altitudes, not common. This widespread species shows much variation in Australia and needs further revision (see Blake, (1940) under *F. diphylla*). A form from Long Gully Lane, A.C.T. with the inflorescence usually congested into a single \pm sessile cluster requires further investigation. Fig. 82.

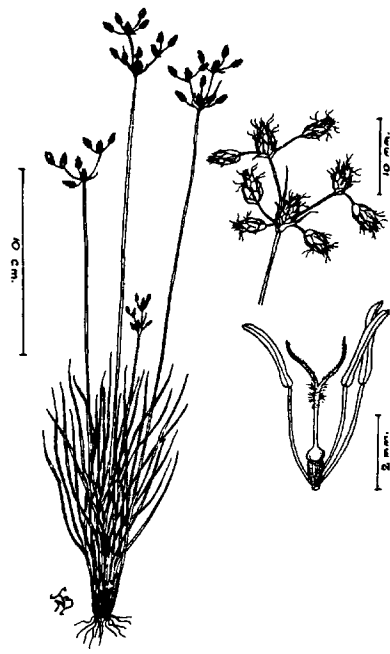
F. dichotoma (L.) Vahl

7. *GAHNIA* J. R. et G. Forst. See Benl (1940), Kükenthal (1943), Addenda

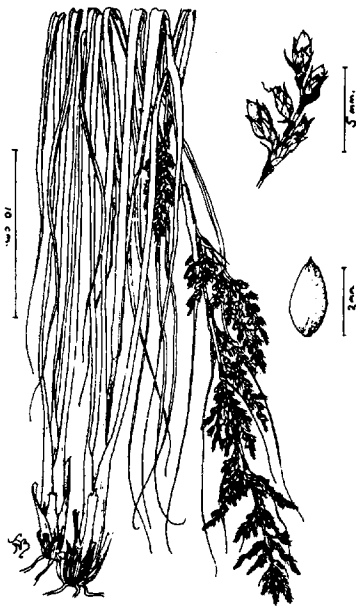
Coarse tufted erect perennial with woody short ascending rhizomes, growing in large clumps up to a metre in diameter at the base; culms cylindrical, usually 60-100 cm. (up to 1.5 metres) high; basal leaf sheaths very dark brown, loose and subpersistent, leaves and bracts antrorsely scabrid, the margins inrolled, becoming \pm filiform distally; spikelets 2-flowered, the terminal hermaphrodite fertile flower subtended by a male flower; glumes



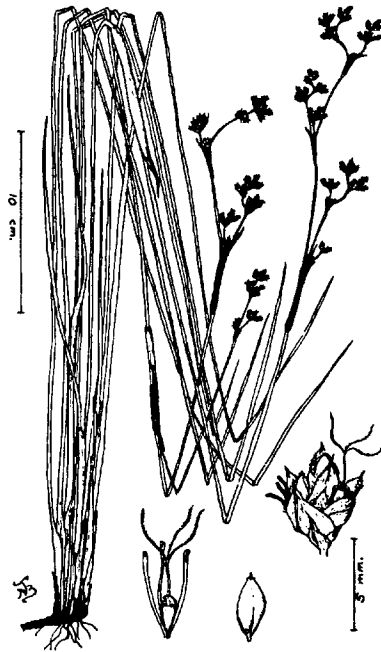
81. *Eleocharis acuta*



82. *Fimbristylis dichotoma*



83. *Gahnia subaequiglumis*



84. *Machaerina rubiginosa*

yellowish-brown becoming \pm black at maturity, the sides and midrib minutely antrorsely scabrid, the lowermost 4-6 glumes empty, acuminate at the apex, the 2 fertile glumes shorter and subacute at the apex; nut pale yellowish-brown becoming shiny blood-red at maturity, obtusely and subequally trigonous in cross section, narrowly elliptical with acute apex in outline, $4.2-5.0 \times 1.8-2.2$ mm., the internal pericarp coarsely and conspicuously transversely incised-annulate; the nuts remain suspended from the spikelets for some time by the persistent filaments and the \pm fused anthers of the male and fertile flowers. Coree Flats near A.C.T./N.S.W. border, Corin Dam road near Kangaroo Creek, slopes of Mt Bimberi; locally common on the margins of swampy flats, intermediate altitudes (above about 3500 ft). Fig. 83.

G. subaequiglumis S. T. Blake

8. MACHAERINA Vahl

1. Spikelets brown or reddish, *3-5-flowered* (usually only developing 1 or 2 nuts), not gaping at maturity, *arranged in loose clusters*; nut smooth, trigonous or compressed trigonous, elliptical in outline, $2.5-3.5$ mm. long, pale becoming reddish or red-brown at maturity; style base pubescent; glumes ciliate on the margins, not compressed distally; perennial with ascending or creeping woody rhizomes; culms 30-100 cm. high, *often with a node above the base*; leaves well-developed, subterete or \pm compressed, about as wide or wider than the culms, pungent-pointed. Rock Valley, Tidbinbilla, swamp near homestead; also Queensland, New South Wales, Victoria, South Australia, and New Zealand.

1. M. rubiginosa (Spreng.)

Koyama

1a. Spikelets pale brownish-red, *1-flowered, gaping at maturity, not clustered* but \pm evenly spaced along the branches of the inflorescence; nut shortly stipitate, smooth, turgid, pyriform with 3 obscure pale or reddish ribs, $2.4-2.6 \times 1.4-1.5$ mm., pale yellow becoming very dark brown and \pm shining at maturity; style base very minutely papillose or almost glabrous; glumes glabrous or almost so, the glume immediately subtending the nut laterally compressed distally; perennial with long-creeping branched woody rhizomes 2-4 mm. diameter; culms terete, *without nodes above the base*, 30-50 cm. high and \pm , 1-1.5 mm. diameter; leaves well-developed, rigid, pungent-pointed, about as wide as the culms; inflorescence 3-10 cm. long, some branches (occasionally the whole inflorescence) often recurved or reflexed. Mt Bimberi, small swampy area, Coree Flats near A.C.T./N.S.W. border; swampy areas at intermediate altitudes, sparsely distributed. Fig. 84.

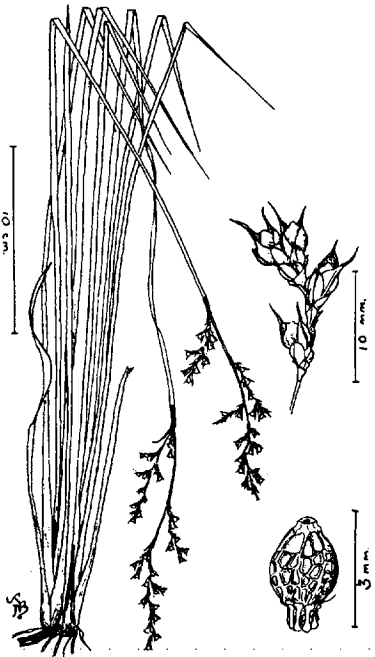
2. M. gunnii (J. D. Hook.) Kern

9. LEPIDOSPERMA Labill.

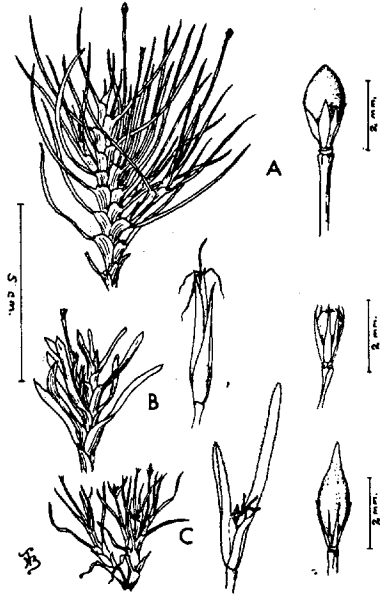
Note: The length of the nut includes the swollen bases of the hypogynous bristles.

1. Densely tufted perennial to about 90 cm. high with strong ascending woody rhizomes; culms strongly flattened with minutely scabrid margins, very variable in width but usually less than 5 mm. wide in A.C.T. specimens, often reddish towards the base; leaves well-developed, similar to the culms but shorter, the sheaths dark brown; inflorescence to 20 cm. long; *glume immediately subtending the ripe nut* $4.8-6.4$ mm. long, *including the constricted distal portion which is* \pm 2-3 mm. long; nut pale or yellowish, $3.2-4.2 \times 1.7-2.4$ mm., the hypogynous bristles swollen and \pm spongy below, produced above into minutely barbellate weak filiform bristles from about half to almost as long as the nut. Queanbeyan area, Black Mountain, Blue Range, Tidbinbilla, Punchbowl Creek near Booroomba, Gudgenby area; sparsely distributed in dry sclerophyll forest, rocky outcrop near rivers, creeks, etc. Fig. 85.

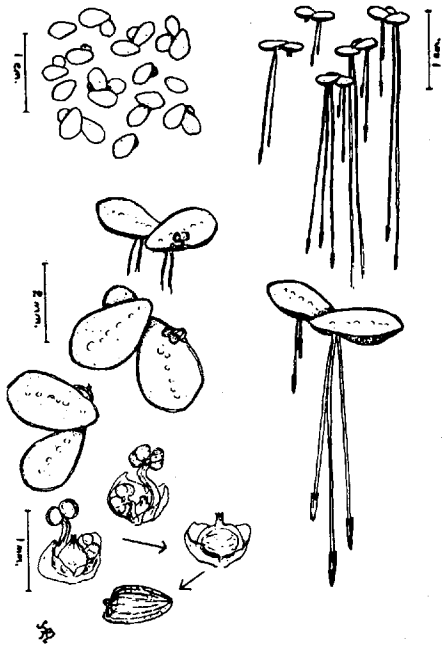
1. L. laterale R.Br.



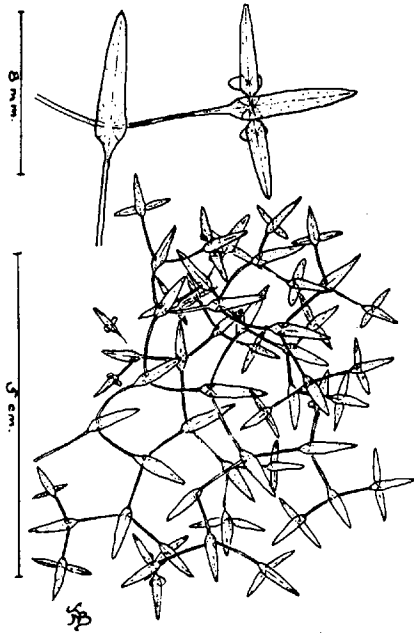
85. *Lepidosperma laterale*



86. A. *Oreobolus distichus*
 B. *Oreobolus pumilio*
 C. *Oreobolus oxycarpus*



87. *Spirodela oligorhiza* (?)



88. *Lemna* sp. aff. *trisulca*

1a. Very similar in general appearance to those forms of the above with narrow culms and leaves, but differing as follows: *glume immediately subtending the ripe nut 3.4-2 mm. long including the constricted distal portion which is ± 1.0 (-1.6) mm. long*; the culms are always less than 2 mm. wide and up to 70 cm. high, and the inflorescence is narrower and usually shorter (less than 10 cm. long); nut 2.9-3.8 \times 1.4-2.0 mm. Black Mountain, Bendora Dam; locally common in dry sclerophyll forest; also tablelands of New South Wales and north-eastern Victoria.

2. *L. laterale* R.Br. var.

10. *OREOBOLUS* R.Br. See Edgar (1964b)

1. Hypogynous scales pale chestnut-brown, *distinctly exceeding the nut*; nut light brown, *obovoid or pyriform*, $\pm 1.4 \times 1.0$ mm., with 3 pale vertical ribs, *truncate and subangular with an irregular marginal ridge at the apex* which is pubescent with microscopic pale trichomes; leaves spirally arranged, almost flat and with serrulate margins distally, the laminae up to about 2.5 cm. long, 1.2-1.6 mm. wide *with usually 5 (-6) translucent veins clearly visible on both sides*; perennial with bright green stiff shiny leaves, forming dense cushions or rather extensive turf-like areas from ascending rhizomes. To date only known in the A.C.T. from the headwaters of Snowy Flat Creek, Mt Gingera, at about 5400 ft, edge of water in small creek over granite, also Mt Kosciusko region of New South Wales, Bogong High Plains Victoria, Tasmania, and New Guinea. Fig. 86B.

1. *O. pumilio* R.Br.

1a. Hypogynous scales pale or whitish, *shorter than the nut*; nut *ovate, elliptic or narrowly rhomboid in outline, acute or acuminate, glabrous*.

2. Nut brown, sometimes pale or whitish on the ribs and towards the ends, *broadly elliptic to narrowly rhomboid in outline, acute or subacute at the apex*, 1.8-2.2 \times 1.1-1.2 mm., *leaves distichous, the laminae usually 2-6 (-7) cm. long and up to 1 mm. wide, subequally trigonous in cross section distally, pale green, stiff, incurved above, with one broad inconspicuous central vein on the adaxial surface and 3 rather inconspicuous veins on the abaxial surface*; perennial forming dense tufts or cushions from ascending rhizomes. Mt Ginini bog, Snowy Flats (Mt Gingera), Mt Bimberi, near summit; fairly common in wet areas in sphagnum swamps at high elevations; also Kosciusko region of New South Wales, Victorian Alps, and Tasmania. Fig. 86A.

2. *O. distichus* F. Muell.

2a. Nut whitish, grey or stained with brown, *narrowly ovoid, acuminate at the apex*, 2.2-2.6 \times ± 1.0 mm., *leaves spirally arranged*, the laminae up to 3.0 cm. long and 0.8 mm. wide, *almost flat distally, pale green with 2 inconspicuous submarginal veins on the adaxial surface and a single conspicuous mid-vein on the abaxial surface*; perennial forming tufts, cushions, or small turf-like areas from ascending rhizomes; (the leaf epidermis has a characteristic minutely granular or rugulose appearance under a lens). Mt Ginini bog, Snowy Flats (Mt Gingera), Mt Bimberi, sphagnum bogs and wet patches at high elevations; not common; also known from Mt Kosciusko area, New South Wales. Fig. 86C.

3. *O. oxycarpus* S. T. Blake

LEMNACEAE

See Daubs (1965)

Note: The Australian species are under investigation. It seems probable that a number of the names used for them have been misapplied and the following arrangement is therefore tentative.

1. Floating plant bodies with hanging rootlets and at least 2 mm. across the longest axis.

2. Each plant body (or segment where the budding pieces remain attached to one another) usually having more than one rootlet hanging from it and inflated on submerged surface.

1. **Spirodela**

2a. Each plant body (or segment) thin or membranous, with a single rootlet or, when linked in a branched frond, sometimes almost rootless.

2. **Lemna**

1a. Floating plant bodies minute, less than 2 mm. in diameter; rootless.

3. **Wolffia**

1. **SPIRODELA** Schleiden

Plant of single or budding discs, each with 1-3 hanging rootlets tipped with conspicuous root-caps; discs convex below, of firm texture, upper surface glossy, mostly reproducing vegetatively; flowers developed in lateral pouches, usually considered to represent 3, with 2 males lateral to a single female; males reduced to single stamen whose anther is exerted above margin of disc, female reduced to pistil; seed solitary, obovate, transverse. Common in drains near and around margins of Lake Burley Griffin; also Coppins Crossing, and Murrumbidgee River. 'Duckweed'. Fig. 87.

S. oligorhiza (Kurz) Hegelm. (?)

2. **LEMNA** L.

1. Floating discs with single rootlets; resembling **Spirodela** but thin in texture, flowers similar. Occurrence in the A.C.T. requires verification; if present would represent material which has been referred to **L. minor** L.

L. sp.

1a. Plants submerged, composing a branched 'frond' in which the individual bodies consist of a very slender stalk and a narrow thin lanceolate blade from near the base of which a new pair of 'leaves' develops; rootlets single or apparently absent at least from terminal segments. Collected in Gudgenby area and representing a local form which has been referred to **L. trisulca** L., a species of the northern hemisphere. 'Ivy Duckweed', 'Star Duckweed'. Fig. 88.

L. aff. trisulca L.

3. **WOLFFIA** Horkel ex Schleiden

The smallest flowering plant known, the floating rootless plant bodies often less than 1 mm. in diameter, flattened above but more or less globose below, flower minute, immersed in upper surface, rarely observed, vegetative reproduction by budding being more usual. Occurrence in the A.C.T. depends on an unverified report which may have been based on seedling plants of **Spirodela**.

RESTIONACEAE

See Johnson and Evans (1966)

1. Stems robust and erect from a horizontal rhizome in mud; spikelets many-flowered; fruit a capsule, glumes with long spreading points; leaf blades absent (A.C.T. sp.).

1. **Restio**

1a. Stems slender, flexuose and branched. Spikelets few-flowered, glumes obtuse or with short points; fruit a nut; sheaths with a short subulate blade.

2. **Calorophus**

1. RESTIO Rottb.

Rigid erect jointed stems to 60 cm. high arising from a horizontal rhizome which is covered by short broad striate scales; sheaths on the erect stems much shorter than the internodes, loose and split to base, dry and stiff, commonly reddish-brown; stems terminating in inflorescences with shorter internodes and shorter broader sheaths which form bracts about the bases of the pedicellate spikelets; spikelets unisexual, the male ones smaller than the female but otherwise similar in general appearance, with the florets in the axils of shining reddish-brown glumes with a prominent midrib and a long slender spreading point. Common in mountain swamps and sphagnum areas, sometimes in dense communities, sometimes following the simple line of a single rhizome. Mt Franklin, Mt Ginini, Mt Gingera and elsewhere at higher elevations from south-eastern Queensland to Tasmania. 'Cord Rush', 'Mountain Cord Rush'. Fig. 89.

R. australis R.Br.

2. CALOROPHUS Labill.

Stems slender, flexuose and with numerous branches, often tangled among other swamp plants; leaf sheaths much shorter than the internodes but not loose, sometimes hairy at the orifice, developing a small subulate blade less than $\frac{1}{2}$ as long; flowers unisexual in the axils of the upper sheaths, males in pairs, females solitary; nut hard and surrounded at the base by the persistent perianth. Common in and near sphagnum swamps and other wet places at high elevations; south-eastern Queensland to South Australia and Tasmania, also New Zealand. 'Rope Rush'. Fig. 90.

C. minor J. D. Hook.

CENTROLEPIDACEAE

CENTROLEPIS Labill.

Small herb less than 6 cm. high, leaves basal, pale and setaceous with broader scarious bases and with scattered bristly hairs; flowers enclosed in 2 opposed broadly ovate bracts with coarse tubercle-based hairs and at the apex of a leafless peduncle 2-3 times as long as the leaves; flowers without perianth, surrounded by 1-3 thin scarious scales with fringed margins and shorter than the bracts, stamen solitary, carpels free and attached to one side of a short carpophore. Not common, collected in damp ground between Uriarra Crossing and Fairlight; southern Australian States, and New Zealand. Fig. 91.

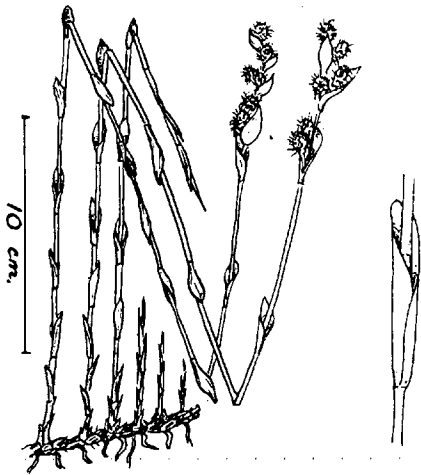
C. strigosa (R.Br.) Roem. et Schult.

ERIOCAULACEAE

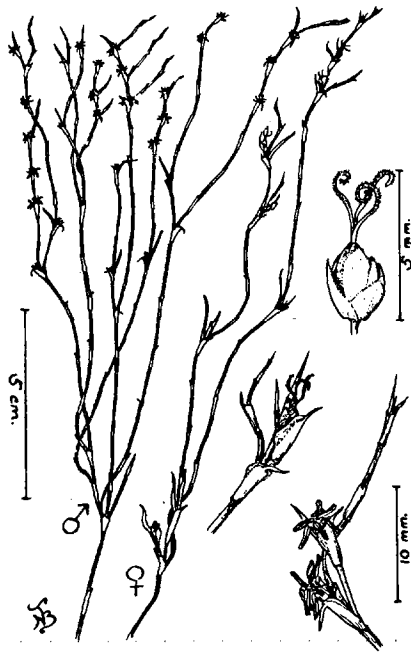
ERIOCAULON L. *See Evans (1966)*

Tufted herb with short grass-like leaves 1-5 cm. long, glabrous but the transverse veins sometimes evident; flowers in globular heads at the ends of slender glabrous peduncles much longer than the leaves and each with a sheathing bract at the base; heads dark grey, 3-4 mm. in diameter, outer bracts empty, others hiding the unisexual flowers; males with 3 outer scales slightly hairy at their tips and 3 inner fringed scales, stamens 6; females with outer scales reduced to 2 and dark-coloured, inner scales fringed, ovary 3-celled and minutely hairy. Uncommon in the A.C.T. but has been collected in Tidbinbilla Valley in swampy ground and between Five Crossings and Mt Coree. Widespread in eastern Australia though rarely common. Fig. 92.

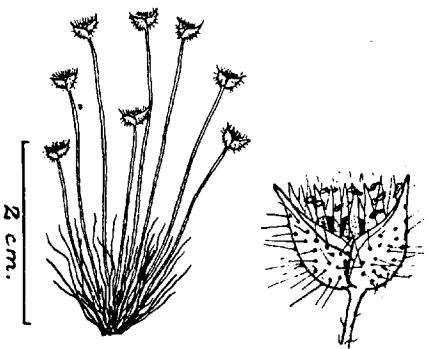
E. scariosum J. E. Sm.



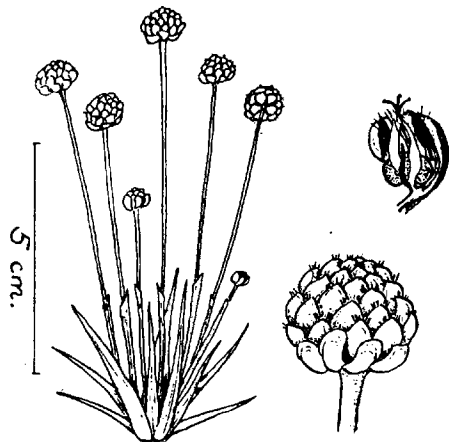
89. *Restio australis*



90. *Calorophus minor*



91. *Centrolepis strigosa*



92. *Eriocaulon scariosum*

JUNCACEAE

1. Leaves glabrous or reduced to basal sheaths; *seeds minute, numerous* in a 3-celled capsule

1. **Juncus**

1a. Leaves flat and hairy; *seeds 3* in a 1-celled capsule.

2. **Luzula**

1. **JUNCUS L.** See *Edgar (1964a)*

Note: Diameter of stem is measured halfway along the stem.

1. Leaves with well-developed laminae

2. Leaves not septate

Group 1

2a. Leaves septate

Group 2

1a. Leaves reduced to sheaths, the laminae rudimentary

Group 3

Group 1

1. *Two scarious bracteoles at the apex of the pedicel closely enfolding the base of each flower*, in addition to the bracts at the base of the pedicels etc.; tepals pale green or brown with scarious or hyaline sides, never dark castaneous brown. Flowers \pm distant on the inflorescence branches or divaricate in rather loose \pm open clusters.

2. *Tufted annual* (easily uprooted) with weak erect or ascending stems, usually less than 15 (-30) cm. high; *flowers usually numerous* and \pm distant on long thin panicle branches, sometimes in small loose clusters. Common in damp areas at low altitudes; almost cosmopolitan. 'Toad Rush'. Fig. 93.

1. **J. bufonius L.**

2a. *Perennial* to 35 cm. high with *tough creeping or ascending rhizomes* (uprooted with difficulty); base of the culms often covered with the fibrous remains of old leaf sheaths; *flowers usually not numerous, divaricate in clusters of usually 2-5 (1-6)*, the clusters subsessile or at the ends of short curved branches which are shorter than the erect involucral bract; outer tepals about 6 mm. long, acuminate, distinctly exceeding the inner tepals and capsule. Fairly common in wet patches in grassland, Eucalypt woodland and dry sclerophyll forest at low altitudes; Canberra area, shores of Lake Burley Griffin, Uriarra Forest near Five Fords, lower slopes of Mt Tennent; all Australian States and New Zealand.

2. **J. homalocaulis F. Muell.**

1a. *Bracteoles absent from the apex of the pedicels*, bracts of the inflorescence only present; flowers arranged in usually dense clusters.

3. Flower clusters 1-2 (rarely 3) on each culm; outer tepals long-acuminate, 4-5-6 mm. long \pm *twice as long as the mature capsule*, usually pale green tinged with red-brown at maturity, *never dark castaneous brown*; *small, often dwarf erect tufted annual*, usually less than 10 (-15) cm. high, with narrow radical leaves. Fairly common at low altitudes in wet seepage areas or areas subject to periodic inundation; Black Mountain area, Long Gully Lane etc.; almost cosmopolitan.

3. ***J. capitatus Weig.**

3a. Outer tepals acute or shortly mucronate, *subequal in length to the mature capsule, the sides stained dark castaneous brown*; *perennials*.

4. Culms 10-25 (-40) cm. high arising from *tough branched long-creeping rhizomes*; leaves almost flat, 1-3 mm. wide; *inflorescence much contracted, usually a single dense capitate cluster (occasionally 2 or 3)*; *tepals \pm 4 mm. long*, the outer shortly mucronate and slightly longer than the inner, with a pale or greenish central portion and dark castaneous sides;

capsule dark, shining castaneous brown at maturity, \pm truncate or 3-lobed at the apex, subequal to or shortly exceeding the perianth segments; stamens 6. Common on margins of streams, sphagnum swamps and other swampy places at intermediate and high elevations; Snowy Flats (Mt Gingera), Mt Ginini bog, Glendale Crossing, Gudgenby River; also New South Wales, Victoria, Tasmania, Japan, and California.

4. *J. falcatus* E. Mey.

4a. Tufted perennial 15-35 (-60) cm. high *without rhizomes*; leaves broad, \pm flat and grass-like, usually 3-10 mm. wide; *flower clusters usually more than 3, often numerous in a \pm open spreading inflorescence*; tepals acute or the outer shortly mucronate, \pm 2 mm. long, with a pale brown or greenish central portion and castaneous sides, subequal to or shorter than the glossy brown mature capsule which is obtuse or truncate and mucronate at the apex; *stamens* 3. Occasional in wet areas at low or intermediate altitudes, e.g. Black Mountain area. (This species bears a superficial resemblance to some forms of *Luzula* but can readily be distinguished by its strictly glabrous leaves.)

5. *J. planifolius* R.Br.

Group 2 (Sect. *Septati*)

1. Flowers large, *usually numerous (more than 8) in each cluster*; tepals 3-5 mm. long; tufted perennials, sometimes with a few short weak ascending rhizomes; stamens 6.

2. Mature capsule *acute, or subobtusate with a short mucro, subequal to or shortly exceeding the perianth by not more than 1 mm.*; flower clusters subglobular or hemispherical in outline, 1-1.5 cm. diameter at maturity; inflorescence spreading, often exceeding the erect involucre bract. Damp places in grassland, margins of swamps and dams; Black Mountain area; near Hall; also New South Wales, Victoria, Tasmania, South Australia, Western Australia, and New Zealand.

6. *J. holoschoenus* R.Br.

2a. Very close to the preceding species, differing mainly in the longer mature capsules *which taper to an acuminate beak (often slightly curved), and exceed the perianth by about 1.5-2 mm.*; flower clusters globular, \pm 1.5 cm. diameter at maturity; inflorescence often more congested and then shorter than the involucre bract. Swampy areas in grassland and wet soakage areas near creeks; sparse throughout the A.C.T. at low and intermediate altitudes, Black Mountain area, Coree Flats near A.C.T./N.S.W. border, Paddy's River, Five Fords, Brindabella road, Mullion Creek, Dingo Dell, Tidbinbilla, Corin Dam road near Gibraltar Creek, Boboyan Flats, Naas Creek, between Gudgenby and Boboyan; also Queensland, New South Wales, Victoria, and New Zealand.

7. *J. fockei* Buchen.

1a. Flowers small, *usually 4-8 in each cluster*; tepals *less than 3 mm. long*; creeping perennials, usually with extensive rhizomes (sometimes tufted and/or rooting from the nodes in *J. articulatus*).

3. Inflorescence not or only shortly exceeding the leaves, *consisting of only a few (less than 6) pale flower clusters*; *outer tepals brown or greenish-brown, 2-2.2-2.8 mm. long*; capsule beaked, much exceeding the perianth, 2.8-4 mm. long, *pale brown when ripe*; small slender rhizomic perennial, usually less than 10 cm. high, forming low mounds or turf-like areas. Common at upper intermediate and high altitudes.

8. *J. pusillus* Buchen.

3a. *Inflorescence of numerous (usually more than 6) dark flower clusters*, usually well exceeding the leaves; *outer tepals stained reddish-brown, 2.8-3.0 mm. long*; capsule beaked, subequal to or shortly exceeding the perianth, 2.8-3.2 mm. long, *dark castaneous and shining when ripe*; rhizomic ascending perennial, occasionally tufted and/or rooting from the nodes, culms usually more than 15 cm. long. Wet mud or sand, or in shallow water, on banks of

creeks, rivers and swamps, or wet soakage areas; very common at low altitudes; widespread in temperate northern hemisphere, introduced in New South Wales, Victoria, South Australia, and New Zealand.

9. **J. articulatus* L.

Group 3 (Sect. *Juncus*)

Note: This group is at present under revision by L. A. S. Johnson (N.S.W.) and some of the species are as yet undescribed; these have been temporarily designated as sp. 'A', sp. 'D' etc. and these letters will be referred to under the new species names when the revision is published.

1. *Flowers in dense globular clusters or ± loosely clustered at the branchlet tips.*
2. *Pith of mature flowering stem continuous throughout or if occasionally discontinuous (in *J.* sp. 'F.') then the sides of the outer tepals stained chestnut-brown.*
3. *Outer tepals ± 3 mm. long, stiff, slightly spreading, almost pungent at apices, pale green or straw-coloured, usually well exceeding the capsule and thus giving the inflorescence a characteristic 'spiky' appearance; capsule ovate or almost globular, 2·6-3 mm. long; the inner walls of old dehisced capsules covered with numerous minute oblique reddish flecks (visible with 10x lens); inflorescence often large and spreading, consisting of numerous clusters at the ends of stiff divaricate branches or sometimes reduced to one or a few ± sessile globular clusters; stamens 3 or 6; culms usually robust, often a metre or more high and 2-4 mm. diameter; leaf sheaths large and loose, yellowish-brown and sometimes shining towards the base, dull pale stramineous above. Near margins of lakes, streams, or wet soakage areas in grassland; common at low and intermediate altitudes.*

10. *J. vaginatus* R.Br.

- 3a. *Outer tepals less than 2·5 mm. long or if slightly longer then subequal to or shorter than the mature capsule; inner walls of old dehisced capsules without minute reddish flecks.*
4. *Sides of the outer tepals stained red or deep chestnut-brown the central portion pale stramineous; flowers arranged in dense subglobular clusters which are either subsessile or ± terminal on stiff bare inflorescence branches to about 7 cm. long; capsule 2·2-2·5 mm. long, at length shiny chestnut-brown (± 'varnished') towards the apex; leaf sheaths loose, chestnut-brown, yellowish-brown or orange at the base, distally dull and stramineous; culms usually 2·3-5 (1·2-4) mm. diameter and 45-100 cm. high; pith usually soft and continuous, occasionally discontinuous in thin-stemmed plants; tufted or with long-creeping rhizomes. Common at high altitudes above 4000 ft and associated with sphagnum and other swampy places; Snowy Flats (Mt Gíngera), Ginini Flats, Corin Dam road near Gibraltar Creek.*

11. *J.* sp. 'F.'

- 4a. *Tepals wholly pale or stramineous.*
5. *Stems bright green, usually more than 2 mm. diameter; pith soft (stems usually easily indented with fingernail); inflorescence usually diffuse and spreading; stomata superficial.*

J. sp. 'D.' (see below)

- 5a. *Stems light green or dull blue-green, usually 2 mm. diameter or less; pith hard (stems not easily indented with fingernail); flowers usually in ± dense clusters; stomata sunken in microscopic epidermal pits.*

J. australis (see below)

- 2a. *Pith of mature flowering stems discontinuous throughout or at least in the lower half of the stem.*
6. *Leaf sheaths loose; stems more than 1·5 mm. diameter.*
7. *Outer tepals acute or subobtuse, less than 2·2 mm. long, subequal to or shorter than the*

mature capsule; inner tepals obtuse with a hyaline membranous margin which at length erodes and leaves the apex acute; mature capsule 1.6-2.4 mm. long, castaneous and \pm 'varnished' towards the apex; culms usually robust, up to 120 cm. high and \pm 5 mm. diameter, with numerous closely crowded striations, dark green or pale green; pith soft, discontinuous throughout or discontinuous below and continuous above; leaf sheaths usually dark red-brown or deep orange towards the base, conspicuously multi-striate distally; stomata superficial (not sunken in pits). Fairly common in mud on the margins of creeks associated with sphagnum bogs, upper intermediate and high altitudes; Bendora to Mt Franklin, Parrot road turn-off, Snowy Flats (Mt Gingera), Mt Ginini bog, Murray's Gap.

12. *J. sp.* 'I.'

7a. *Outer tepals acuminate, more than 2.2 mm. long, subequal to or longer than the mature capsule*; stomata sunk in microscopic pits in the epidermis.

8. Stems blue-green or greyish-green, usually 60-90 (30-120) cm. high and 2-3 (1.5-4) mm. diameter, pith usually hard and discontinuous or continuous, (sometimes soft and almost wanting in water-grown plants); inflorescence many-flowered, often consisting of dense globular heads which are subsessile and/or terminal on one to several bare branches, or much-branched with numerous \pm hemispherical clusters; mature capsules \pm 2-2.5 mm. long; stamens 3-6; leaf sheaths loose, shiny dark castaneous at base, yellowish-brown or stramineous distally. Very common at low altitudes, drainage and soakage areas and depressions subject to periodic inundation, in grassland and Eucalypt woodland; also New South Wales, Victoria, South Australia, Tasmania, and New Zealand.

13. *J. australis* J. D. Hook.

8a. Similar in general appearance to some forms of the above but stems bright green, striations crowded and more numerous, pith soft, discontinuous in flowering culms which are often yellowish towards the base, and mature capsules larger and \pm 2.8 mm. long. Not common, usually with the bases in 4-6 inches of water near the edges of lakes and large semi-permanent expanses of water.

14. *J. sp.* 'K.'

6a. *Leaf sheaths closely enfolding the stem; stems less than 1.5 mm. diameter.*

9. Stems hard and wiry, 0.5-1 mm. diameter, grey-green or blue-green, usually less than 45 cm. high; *striations coarse, usually less than 20*; pith discontinuous with very small lacunae; inflorescence usually one to several small compact clusters, each about 1 cm. diameter; stamens 3; leaf sheaths closely enfolding the stem, castaneous or pale brown below, yellowish-brown or dull stramineous distally. Very common in wet soakage areas in Eucalypt woodland, dry sclerophyll forest and grassland, at low and intermediate altitudes; also New South Wales, Victoria, and New Zealand.

15. *J. filicaulis* Buchen.

9a. *Striations crowded, more than 25*; stems usually 30-60 cm. high and \pm 1 mm. diameter.

J. subsecundus form (see below)

1a. *Flowers not clustered but \pm evenly spaced along the branchlets of the inflorescence.*

10. *Fertile stems less than 1.6 mm. diameter and/or outer tepals less than 2.2 mm. long; stomata superficial.*

11. *Outer tepals 1.3-2 mm. long, acute at the apex, much shorter than the mature capsule*; inner tepals subequal to or slightly shorter than the outer, obtuse with a broad membranous margin which at length shrivels or erodes leaving the acute mid-portion; capsule \pm 2.0 (1.8-2.4) mm. long; stems green, usually 35-100 (-120) cm. \times 0.75-1.5 mm.; pith usually interrupted; leaf sheaths pale or dark castaneous and shining or pink towards the base, loose and stramineous distally, to 18 cm. long. Very common along river and creek banks

and around the margins of lakes and ponds; usually at or not far from the water's edge; low altitudes; also Queensland, New South Wales, Victoria, South Australia, New Zealand, and New Caledonia.

16. *J. usitatus* L. Johnson

11a. *Outer tepals 2.2-3 mm. long, subequal to or longer than the mature capsule, pale green or stramineous, shortly apiculate or almost pungent at the apex; capsule 2.2-2.8 mm. long; inner tepals subequal in length to or shorter than the outer, acute or subobtusate with a membranous margin; capsule 2.0-2.6 mm. long; usually in small clumps, stems wiry, 40-60 cm. $\times \pm 1.0$ (0.6-1.4) mm., strongly ridged; pith interrupted with small lacunae; leaf sheaths usually less than 6 cm. long (to 10 cm. in old open sheaths) dull pink or yellowish-brown below, pale stramineous distally, at first closely appressed to the stem; inflorescence usually spreading, the flowers \pm evenly spaced along the branches, usually less than 9 cm. long and shorter than the erect subtending floral bract, or sometimes the inflorescence short and condensed. Common at low altitudes, damp depressions or seepage areas in grassland, Eucalypt woodland or dry sclerophyll forest, or in dry areas subject to periodic flooding; also Queensland, New South Wales, Victoria, South Australia and introduced into New Zealand.*

17. *J. subsecundus* N. A. Wakefield

10a. *Fertile stems more than 1.9 mm. diameter, and/or outer tepals ± 3 mm. long; stomata superficial, or sunken in microscopic pits in the epidermis (in *J. sarophorus*).*

12. *Outer tepals ± 3 mm. long; capsule 2.8-3.2 mm. long, stems 30-75 cm. high, 1.5-2.5 mm. diameter; flowers second and distant on the long branches of the inflorescence, which is usually more than 9 cm. long and subequal to or overtopping the erect floral bract; leaf sheaths loose, pale brown, orange-brown or yellowish below, stramineous distally, usually less than 12 cm. long; pith discontinuous. Locally common in damp depressions or areas subject to periodic inundation; area around Black Mountain, at low altitudes.*

18. *J. sp. 'A.'*

12a. *Outer tepals less than 2.7 mm. long.*

13. *Outer tepals 1.6-2.5 mm. long, acuminate at the apex, subequal to or usually exceeding the capsule; mature capsule 1.6-2.3 mm. long; stems blue-green or green, usually 70-120 (-180) cm. high and 2-3 mm. diameter, pith usually discontinuous throughout (rarely continuous), leaf sheaths tightly rolled and dark reddish-purple, dark castaneous or almost black and shining at the base, becoming loose and stramineous distally, the uppermost usually 12-20 (-40) cm. long; stomata sunken in microscopic depressions in the epidermis; inflorescence usually dense and many-flowered, the branches suberect in one or several fan-shaped masses, shorter than the long erect floral bract. Very common in wet soakage areas and swampy places at low and intermediate altitudes up to about 4000 ft (in *Carex appressa* swamps), turnoff to Lee's Creek road on Brindabella road, Blue Range Forest area, Tidbinbilla, Gudgenby area; also New South Wales, Victoria, Tasmania, South Australia, and New Zealand.*

19. *J. sarophorus* L. Johnson

13a. *Outer tepals 2.0-2.5 mm. long, subequal to or usually shorter than the capsule; mature capsule 2.0-2.6 mm. long; stems green, usually 75-125 (-180) cm. high \times 2-4 mm. diameter, pith usually soft and continuous throughout or discontinuous below and continuous above; leaf sheaths loose, dark shining castaneous and/or deep orange towards the base, stramineous distally, the uppermost 9-12 (-30) cm. long; stomata superficial; inflorescence variable, usually rather diffuse, shorter than or subequal to erect floral bract. New Chum road, Cotter Valley, intermediate altitudes but distribution in the A.C.T. not well known.*

20. *J. sp. 'D.'*

2. LUZULA DC.

The Australian species are under investigation. At present specimens are referred to *L. campestris* (L.) DC., but several species are represented in the A.C.T. Fig. 94.

LILIACEAE

1. Tepals dry and papery, pinkish or white; stems wiry and with tufts of short slender leaves.

1. *Laxmannia*

1a. Tepals petaloid or the outer 3 sepaloid and the inner petaloid.

2. Evergreen perennial with leaves persistent.

3. Leaves all or almost all basal, strongly angled along the midrib and the margins often recurved or revolute; staminal filaments not bearded; fruit fleshy.

2. *Dianella*

3a. Stems leafy, leaves conduplicate; seeds in a dry capsule; staminal filaments bearded; plants shrubby.

3. *Stypandra*

2a. Herbaceous perennial, leaves not persisting from year to year.

4. Tepals blue, purple, or white.

5. Tepals white or white flushed with pink; staminal filaments thick, flattened but not bearded; ovary red or purple-black.

6. Flowers in a spike, unisexual or functionally so; tepals crossed by a dark purple mark.

4. *Anguillaria*

6a. Flowers umbellate, bisexual; tepals white.

5. *Burchardia*

5a. Tepals blue or purplish.

7. Inner tepals with fringed margins; staminal filaments short and not bearded.

6. *Thysanotus*

7a. Inner tepals without fringed margins, margins commonly undulate.

8. Tepals not spirally twisted after flowering, purplish or pale.

9. Staminal filaments bearded; flowers not withered within a few hours.

7. *Arthropodium*

9a. Staminal filaments not bearded, anthers with papillose appendages sometimes shortly adnate to very summit of the filament; flowers opening in morning and soon withered.

8. *Dichopogon*

8a. Tepals spirally twisted after flowering, deep blue.

9. *Caesia*

4a. Tepals yellow.

10. Leaves all basal; flowers in a raceme.

10. *Bulbinopsis*

10a. Basal leaves soon withering, stem leaves reduced at the nodes of thin wiry stems; flowers in umbels.

11. *Tricoryne*

1. LAXMANNIA R.Br.

Leaves linear-terete, commonly about 2 cm. long but up to 8 cm., with scarios sheaths which are woolly on the margins; stem leaves appearing tufted owing to axillary clusters of short shoots; flowers in small heads on terminal peduncles, subtended by short scarios bracts; outer tepals pink or red-flushed where exposed; capsule shorter than persistent

perianth; seeds black with a finely granular surface. Common in woodland habitats in eastern Australia. 'Silverweed', 'Wire Lily'. Fig. 95.

L. gracilis R.Br.

2. DIANELLA Lam.

1. Tufted perennial with short ascending rhizome and stiff distichous leaves up to 60 cm. long; *leaves rough along the keeled midrib on the undersurface*, conduplicate at base, revolute along the margins; tepals 5-nerved, the inner with thin membranous margins; stamens with club-shaped filaments, *anthers yellow and about as long as the swollen end of the filaments*; seeds black in an oblong *blue or purple berry up to 2 cm. long*. Common in forest gullies and in alpine woodland in New South Wales, Victoria, and Tasmania. 'Blue Flax Lily'. Fig. 96.

1. D. tasmanica J. D. Hook.

1a. Strongly rhizomatous plants similar to above but with narrower more strongly revolute leaves not more than 1.5 cm. wide and *not rough along the keeled midrib*; flowers similar to those of the above but the *anthers dark purple-brown or black and longer than the swollen tip of their filaments*; berry 7-10 mm. long. Uncommon in the A.C.T. but occurs on Black Mountain; widespread in southern and eastern Australia and Tasmania. 'Flax Lily'.

2. D. revoluta R.Br.

3. STYPANDRA R.Br.

Tufted perennials with stiff distichously arranged stem leaves and up to 1 metre high; leaves 5-20 cm. long, stem-clasping and conduplicate, smooth and slightly glaucous; flowers blue, nodding on recurved pedicels in short racemose cymes at the ends of the branches, the lower branchlets of the cymes subtended by ovate or ovate-lanceolate leafy bracts; tepals 3-nerved with thin margins, spreading or recurved, stamens pendulous, filaments with dense golden-yellow beards, anthers curved; seeds black in a 3-valved capsule. A common shrubby plant in dry sclerophyll forest at lower elevations. Widespread in eastern Australia. 'Nodding Blue Lily'. Fig. 97.

S. glauca R.Br.

4. ANGUILLARIA R.Br.

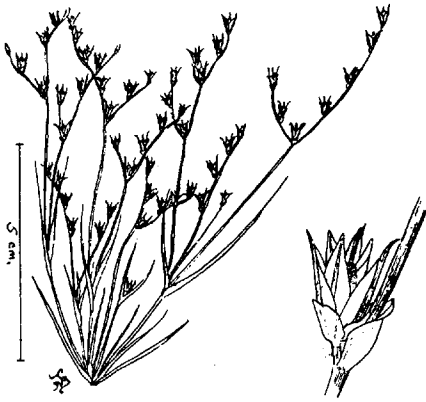
Perennial herb with a bulbous rootstock and simple stems bearing 2-3 leaves with broad stem-clasping bases; flowers usually white (occasionally flushed pink), 2-7 sessile in a flexuose spike; tepals equal in size and almost invariably with a conspicuous black or purple mark about $\frac{1}{3}$ from the base, 7-10 mm. long; in male flowers the tepals are linear, the staminal filaments flat below and a rudimentary ovary may be present; female flowers have oblong tepals, sterile anthers often present and the ovary is dark coloured with 3 sessile stigmas. A very common species in grassy areas especially in seepage slopes or near swamps. One of the first to flower in early spring, widespread throughout Australian mainland and Tasmania. 'Early Nancy'. Fig. 98.

A. dioica R.Br.

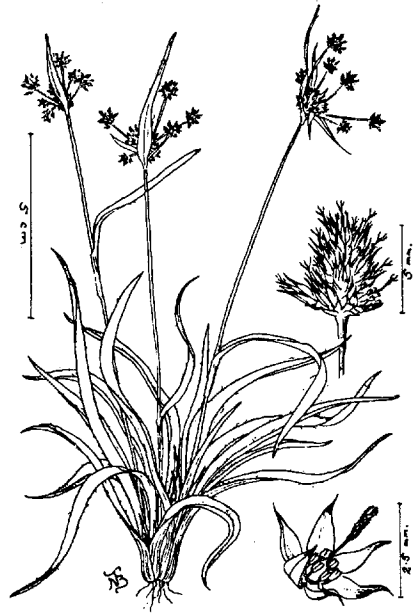
5. BURCHARDIA R.Br.

Perennial herb with fleshy roots; base of the stem covered by a tubular sheath which is split above, lower leaves with sheathing bases and linear blades, upper 1-2 leaves reduced to short bracts on the lower part of the long peduncle; flowers umbellate, subtended by a whorl of small linear bracts; tepals white, sometimes tinted on back, oblong to oblanceolate-elliptical and all similar; anthers shorter than their filaments which have broad bases; ovary commonly reddish, angular with three stigmas. Very widespread in temperate Australia from Western Australia to southern Queensland though not very common in the A.C.T. 'Milkmaids'. Fig. 99.

B. umbellata R.Br.



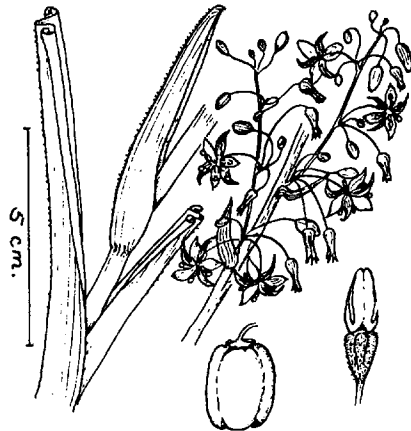
93. *Juncus bufonius*



94. *Luzula* sp.



95. *Laxmannia gracilis*



96. *Dianella tasmanica*

6. THYSANOTUS R.Br.

1. *Erect perennial herb with long slender radical leaves almost or quite as long as the erect inflorescence; bases of leaves thin and scarious or membranous; flowers in bracteate panicles; tepals 12-15 mm. long, the outer narrow lanceolate and acuminate, the inner with broad lateral membranes fringed on the margins; anthers slender, pale, on short filaments bent to one side of the ovary; tepals closing over the capsule but not spirally twisted; seeds black and carunculate. Widespread in temperate and warm areas of Australia; not uncommon in A.C.T. and usually found in woodland or open forest habitats. 'Fringed Lily'. Fig. 100.*

1. *T. tuberosus* R.Br.

1a. *Stem twining, radical leaves soon lost, stem leaves reduced to minute bracts; flowers pale purple, terminal to or on intricately twined branchlets; tepals 7-10 mm. long, the outer linear, inner broader with thin fringed margins; stamens on short filaments and twisted to one side of ovary; tepals closing over capsule but not twisted. A very widespread species in temperate and warm areas of Australia but uncommon in the A.C.T. 'Twining Fringed Lily'.*

2. *T. patersonii* R.Br.

7. ARTHROPODIUM R.Br.

1. *Small perennial herb, usually less than 30 cm. high, with tuberous roots sessile at base of plant; leaves radical, slender, erect or spreading, linear-terete and somewhat fleshy; raceme longer than leaves, pedicels recurved or nodding; flowers mostly solitary in each bract; tepals 4-6 mm. long, lilac or purple, inner ones with slightly wider membranous margins; stamens on slender filaments of which the upper halves are obscured by a dense but short papillose beard, anthers usually about as long as broad (to twice as long); capsule subglobular within persistent and later scarious tepals; seeds black. In open woodland habitats or dry forest areas at lower elevations, e.g. Burbong, Hall, Tharwa; also Queensland, New South Wales, Victoria, Tasmania, and South Australia. 'Small Vanilla Lily'.*

1. *A. minus* R.Br.

1a. *More robust than preceding, tubers distant from stock; leaves 10-30 cm. long, 4-6 mm. wide; inflorescence commonly branched; flowers arising 1-3 in each bract; tepals 7-9 mm. long, pale lilac (rarely white), recurved after flowering; stamens with filaments obscured by a dense pale beard for at least $\frac{2}{3}$ of their length, anthers at least 3 times as long as broad and strongly curved. Common species on mountain slopes, gullies and in cool shaded habitats at all elevations; also Queensland to Tasmania, South Australia, and New Caledonia. Flowering in late summer, distinctly vanilla-scented. 'Vanilla Lily'. Fig. 101.*

2. *A. milleflorum* (DC.) Macbride

8. DICHOGOON Kunth

*Slender perennial herb with tuberous roots distant from butt; radical leaves slender, surrounded by fibrous bases of old sheaths; flowers pedicellate in racemes or panicles, 1-3 in axils of small scarious bracts, erect or spreading in flower, pedicels later reflexed; tepals purple, 10-12 mm. long, outer ones lanceolate, acuminate, inner broader and obtuse owing to broad lateral membranes; stamens on very short filaments which are not bearded but the slender anthers have a minute papillose basal appendage (sometimes shortly adnate to summit of filament); capsules subglobular. Flowering about December, scented like dark chocolate, withered by midday. Widespread on the Australian mainland. The genus is sometimes united with *Arthropodium*. 'Chocolate Lily'. Fig. 102.*

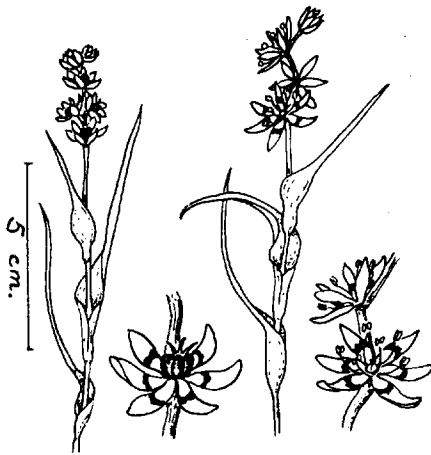
D. fimbriatus (R.Br.) Macbride

9. CAESIA R.Br.

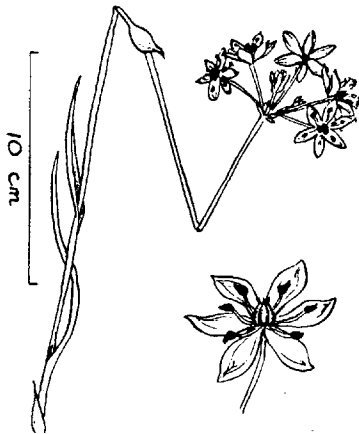
Slender herb with tuberous roots, leaves slender and grass-like, mostly radical but one or two smaller ones on flowering stems; flowers pedicellate in racemose panicle, clustered



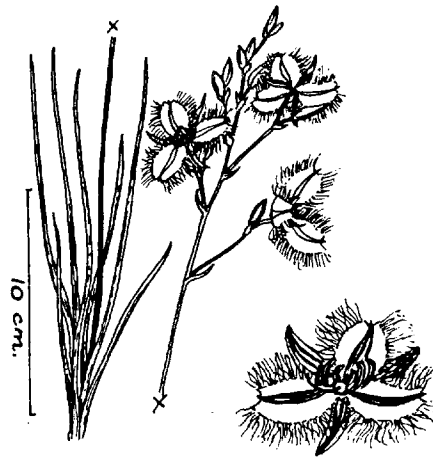
97. *Stypantra glauca*



98. *Anguillaria dioica*



99. *Burchardia umbellata*



100. *Thysanotus tuberosus*

in axils of scarious bracts, internodes short while young; tepals dark blue, 7-9 mm. long with nervate centres and narrow margins; staminal filaments slender, not bearded, longer than small yellow anthers; tepals strongly twisted after flowering and covering the capsules which are 3-lobed. Widespread in southern Australia but not common in the A.C.T. though found in a few places in savannah woodland or disturbed forest areas. 'Blue Grass Lily'. Fig. 103.

C. vittata R.Br.

10. **BULBINOPSIS** Borzi

Perennial herb with a bulbous rootstock; leaves slender and rather fleshy, the outer ones with scarious margins at the base and surrounded by a few short scarious scales which may be purplish; flowers in a simple erect raceme longer than the leaves, pedicellate and subtended by scarious bracts with broad bases; tepals golden-yellow with a darker line up the midrib, 12-18 mm. long; staminal filaments slender with a cluster of clavate papillose hairs below the anthers; tepals enclosing the globular capsule but not twisted; seeds black and angular. A common species of grassy woodland areas where it is abundant locally but also occurring throughout the mountains up to the highest elevations. Flowers about October near Canberra but in late summer on high mountain ridges. Widespread in southern and eastern Australia and Tasmania. 'Golden Lily', 'Native Leek'. Fig. 104.

B. bulbosa (R.Br.) Borzi

11. **TRICORYNE** R.Br.

Perennial with slender wiry stems 20-50 cm. long and divaricately branched; basal leaves grass-like or reduced but withering early; stem leaves reduced and usually subtending one or two branches; flowers in terminal umbels subtended by broad scarious bracts shorter than the pedicels which are 3-6 mm. long; tepals pale but bright yellow and spreading, 6-8 mm. long, oblong with a 3-nerved centre and spirally twisted after flowering; stamens with a dense cluster of golden hairs in the middle of each filament; style undivided; fruit divided to the base into 3 1-seeded sections of which 1 or 2 may be aborted. A common plant in grassland or woodland habitats at lower elevations and widespread throughout temperate Australia. Flowering in November to March near Canberra. 'Yellow Rush Lily', 'Star Lily'. Fig. 105.

T. elatior R.Br.

XANTHORRHOEACEAE

1. Tufted plants with flattened striate leaves with erose or toothed apices; flowers in bracteate panicles or racemes.

1. **Lomandra**

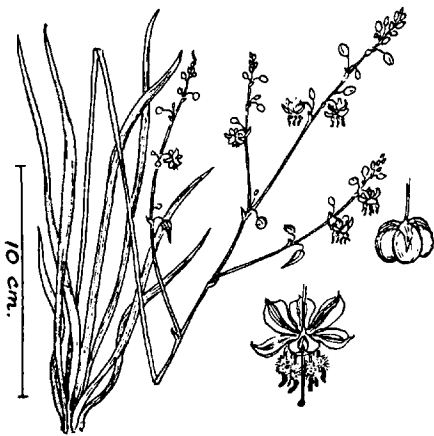
1a. Large plants with blackened trunks and apical masses of spreading angular leaves with brittle points; flowers in dense erect thick spikes.

2. **Xanthorrhoea**

1. **LOMANDRA** Labill. *See Lee (1966)*

1. Flowers clustered in whorls; coarse plants with leaves often more than 2 mm. wide.

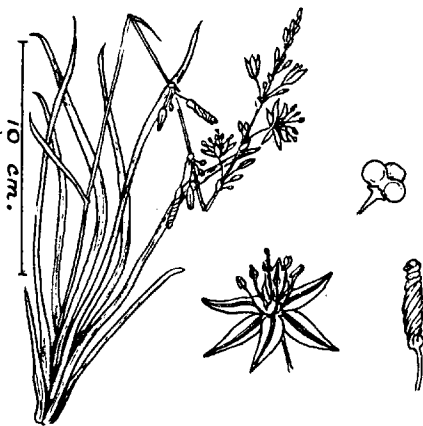
2. Tussocky perennial, the scarious basal margins of the leaves rich brown in colour and soon becoming fibrous, blades 3-10 mm. wide with about 20 striations, *margins smooth or minutely scabrid* especially near the oblique 2-3-toothed apices, 40-80 cm. long; inflorescence shorter than leaves, *peduncle strongly flattened, flower clusters and lateral branches subtended by rigid spreading narrow lanceolate subpungent bracts up to 2 cm. long*; lower branches paired, upper with whorled clusters of flowers; male flowers sessile with outer tepals free, 4 mm. long, ovate, purple at summit; inner tepals slightly longer and thicker, tubular at



101. *Arthropodium milleflorum*



102. *Dichopogon fimbriatus*



103. *Caesia vittata*



104. *Bulbinopsis bulbosa*

base; anthers uniform in size; female flowers in smaller inflorescences, bracts often conspicuous, tepals broader than in males, inner ones almost free to base; capsule brown, splitting loculicidally, exocarp free from endocarp; seeds pale brown, curiously wrinkled on surface. Common in savannah woodland and forest habitats; widespread in southern and eastern Australia, also Tasmania. 'Matrush'. Fig. 106.

1. *L. longifolia* Labill.

The two following subspecies both occur in the A.C.T. but are not always easily separable:

a. subsp. *longifolia*. Leaves up to 10 mm. broad; panicle 5-6 cm. broad, with 6-8 pairs of distichous branches. More common at lower elevations.

b. subsp. *exilis* A. Lee. Leaves 1.5-5 mm. broad; panicle often dense, less than 2.5 cm. broad or reduced to short spike. At various altitudes but more common at higher levels.

2a. Tufted perennial, the scarious basal margins of the leaves dark or purplish, blades 2-4 mm. wide, to 40 cm. long with about 12-24 striations, *papillose-scabrid on margins*, apices obliquely erose or toothed; inflorescence less than $\frac{1}{2}$ as long as leaves, *peduncle terete or slightly angular*, floriferous for more than $\frac{1}{2}$ its length, *flower clusters not subtended by conspicuous spreading bracts*; male flowers on long slender pedicels above bracts and bracteoles, densely clustered at the nodes; outer tepals 3-3.5 mm. long, concave with incurved apices, joined basally in short narrow tube; inner tepals oblanceolate, margins incurved; anthers uniform; female flowers sessile, slightly longer than male, outer tepals less concave. Widespread on Australian mainland; in woodland and open forest sites. 'Matrush'.

2. *L. multiflora* (R.Br.) J. Britt.

1a. Flowers not clustered in whorls; fine-leaved plants, leaves usually less than 2 mm. wide.

3. *Inflorescence loosely paniculate or racemose, on a slender peduncle* and from $\frac{1}{4}$ to $\frac{3}{4}$ as long as leaves.

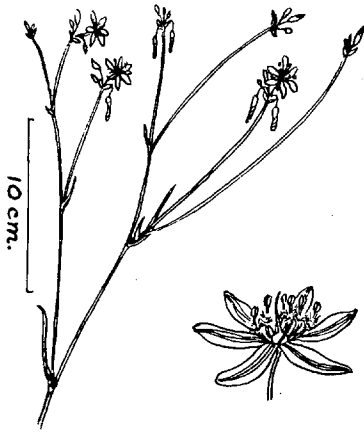
4. Tufted perennial; leaves slender, 1-1.5 mm. wide, to 40 cm. long, with *less than 12 striations*, concave-incurved on margins which are smooth or minutely papillose-scabrid, apices obtuse or toothed; *branches of inflorescence smooth or minutely scabrid*; pedicels of male flowers about as long as tepals, subtended by minute scarious bracts; outer tepals purplish, shortly tubular at base, broad and thin above, about $\frac{1}{2}$ as long as inner; inner tepals about 2 mm. long, thicker in texture and yellowish, margins incurved, apex inflexed over tepalar anthers which are larger than the others; female flowers fewer per inflorescence, all tepals purplish, outer ovate-elliptical, more than $\frac{1}{2}$ as long as inner, angular-gibbous on back; capsule more than twice as long as persistent tepals of which inner are slightly enlarged. Woodland and dry sclerophyll forest areas from Queensland to Victoria.

3a. *L. filiformis* (Thunb.) J. Britt.
subsp. *filiformis*

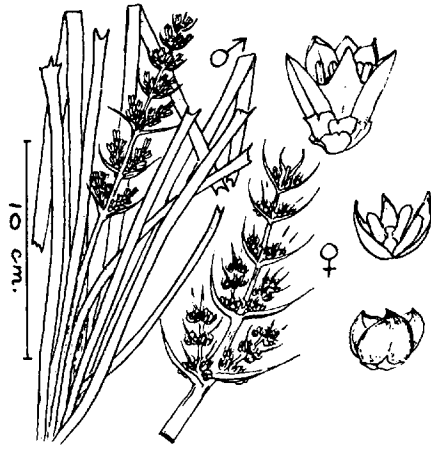
4a. Leaves flat or slightly concave, 1.5-2 mm. wide, with *12-16 striations, margins conspicuously and lower (convex) surface minutely, papillose-scabrid*; *branches of inflorescence conspicuously papillose-scabrid* (under a lens); male flowers similar to those of preceding but outer tepals more than $\frac{1}{2}$ as long as inner. In similar habitats to preceding; also New South Wales and Victoria.

3b. *L. filiformis* (Thunb.) J. Britt.
subsp. *coriacea* A. Lee

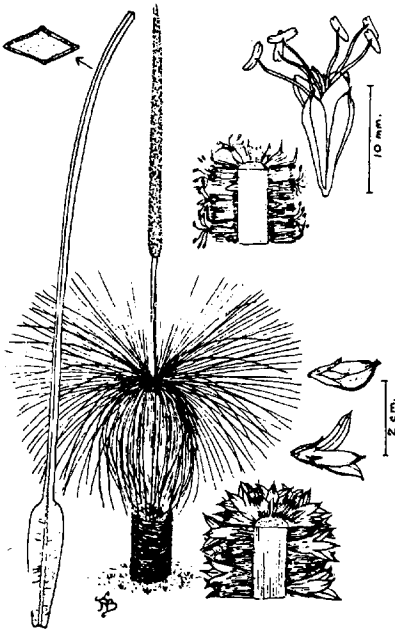
3a. *Inflorescence short and contracted, barely protruding above ground level*; leaves flat, thick with about 12 striations, smooth or margins minutely scabrid; male flowers shortly pedicellate or subsessile in axils of broad scarious bracts and bracteoles; tepals pale, outer ovate-elliptical, thin and almost as long as inner; inner 2 mm. long, thicker in texture with thin incurved margins, anthers almost uniform in size; female flowers slightly larger than male, outer tepals more rigid and ovate above a short narrow base, thickened up the central line; inner somewhat fleshy, more or less spreading but with minutely inflexed apices, capsule



105. *Tricoryne elatior*



106. *Lomandra longifolia*



107. *Xanthorrhoea australis*



108. *Hypoxis hygrometrica*

several times longer than persistent perianth. Grassland areas marginal to and in woodland and dry forest areas, e.g. Molonglo Gorge; Western Slopes, Central and Southern Tablelands of New South Wales.

4. *L. bracteata* A. Lee

2. *XANTHORRHOEA* J. E. Sm. See Lee (1966)

Perennial with simple trunks to more than 2 metres high and dense masses of spreading rigid angular leaves with brittle apices; trunks composed of a pithy core surrounded by the flattened glossy brown bases of the older leaves, the apices of these bases commonly blackened by fire; leaves flattened-quadrangular, minutely scabrid on the angles; flower-spikes several per plant, arising among the upper leaves and up to 2 metres high with the stout peduncle up to 7 cm. in diameter and 30-50 cm. long; flowers creamy white, very numerous and densely covering the thick rhachis, sessile among numerous bracts as long as or longer than the tepals; outer tepals oblanceolate, shortly acuminate; inner tepals thinner in texture, slightly hooded above and minutely papillose at the apex; stamens 6, longer than the tepals and spreading in flower; capsule protruding when ripe, glossy brown, 3-valved; seeds black. Grows on stony slopes in dry sclerophyll forest or on areas from which this type of forest has been removed, e.g. Mt MacDonald above the Murrumbidgee River, Uriarra Crossing and the upper slopes of cleared land in Tidbinbilla Valley; also from Queensland south to Tasmania and South Australia. 'Blackboy', 'Grass Tree'. Fig. 107.

X. australis R.Br. subsp. *australis*

AMARYLLIDACEAE

NOTHOSCORDUM Kunth

Perennial herb with white globose bulbs more than 1 cm. diameter, each producing numerous bulblets during growing season; leaves radical, linear, 20-30 cm. long, strongly onion-scented; umbels pedunculate, flowers pedicellate, tepals 6, white or pale lilac, tubular at base, stamens short, ovary inferior, capsule 3-locular. A troublesome weed in a farm garden near the Cooma Road and a potential weed for the A.C.T. Possibly of South American origin but almost cosmopolitan; naturalised in Queensland, New South Wales, Victoria, and South Australia. 'Onion Weed'.

**N. inodorum* (Ait.) Nicholson

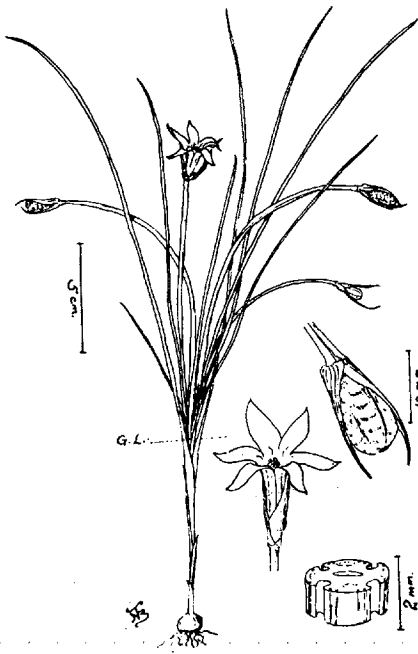
HYPOXIDACEAE

HYPOXIS L.

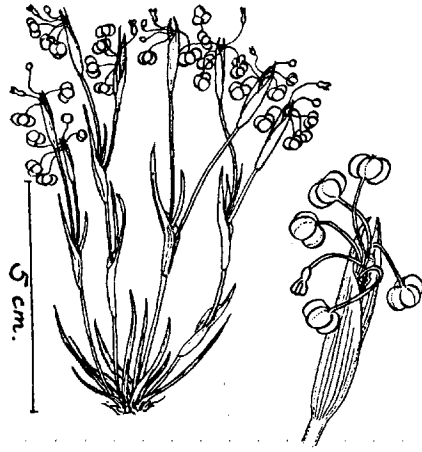
1. Small perennial herb often less than 10 cm. high, with grasslike leaves, arising from a deeply placed butt covered with old leaf bases and linked with a *glabrous fleshy cylindrical tuber*; flowers 1-3 but often solitary on the slender *peduncle which lacks any bract* and is shorter than the narrow sparsely hairy leaves; tepals *golden-yellow* but paler or greenish on the back and 8-12 mm. long; outer series sometimes with a few long hairs outside and with minute reflexed hair tuft inside the apex; inner series glabrous, all spreading in flower; anthers 6, the filaments slender and centrally attached between the *divergent bases of the anther cells*; ovary inferior; capsule dark green with persistent perianth, seeds black and angular. Very common in swampy areas in grassland or in grassy forest clearings, ranging from Queensland to Tasmania. 'Golden Star'. Fig. 108.

1. *H. hygrometrica* Labill.

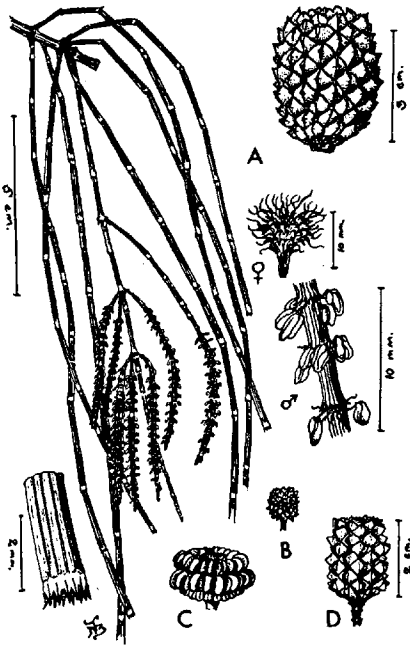
1a. Similar in habit to the preceding but quite glabrous and with the leaves arising from a *tuberous 'bulb' which is covered with tangled fibres*; flowers usually solitary on the slender peduncle which has a *bract developed* about half way up its length; *tepals pale yellow within, greenish outside*, 5-15 mm. long, anthers on slender filament but *erect and adnate*; capsule



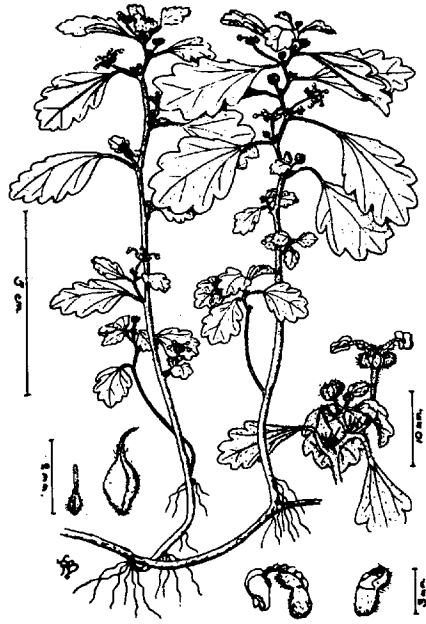
109. *Romulea longifolia*



110. *Sisyrinchium micranthum*



119. A. *Casuarina stricta*
 B. *Casuarina cunninghamiana*
 C. *Casuarina luehmannii*
 D. *Casuarina littoralis*



120. *Australina muelleri*

similar to that of above. Less common than *H. hygrometrica* but has been collected in similar habitats at Uriarra and at Hall. Widespread in southern Australia.

2. *H. glabella* R.Br.

IRIDACEAE

1. Herb with wiry leaves arising from a corm; flowers solitary in the axil of a spathe.

1. *Romulea*

1a. Small herb with radical and stem leaves; flowers clustered, with slender pedicels.

2. *Sisyrinchium*

1. **ROMULEA** Maratti

Perennial herb with deeply placed brown corm covered by dry scales; leaves radical, slender and wiry, cross-shaped when sectioned because of the prominent midrib; flowers solitary in the axils of 2 scarious bracts which form a spathe at the summit of a stiff peduncle shorter than the leaves; tepals deep pink within (drying lilac) but yellow towards base and greenish outside, 15-20 mm. long and all similar; stamens not more than $\frac{1}{2}$ as long as the tepals; capsule oblong, about 10 mm. long and shorter than the persistent spathe bracts, fruiting peduncle often recurved; seeds brown. A South African species which has become naturalised over wide areas of southern Australia. It may be locally abundant in some areas along roads or in pastures but is not very common in the A.C.T. 'Onion Grass'. Fig. 109.

**R. longifolia* (Salisb.) Baker

2. **SISYRINCHIUM** L.

Annual herb 10-15 cm. high with radical leaves and jointed stems bearing leaves with clasping bases; leaves flaccid but grasslike, narrow linear; flowers clustered on very slender pedicels arising between opposing leafy bracts; flowers slender, tepals yellow or dark tipped, soon withered, joined below in a very short tube which encloses the anthers; stigma pilose; capsule globular or flattened slightly from above, reddish, 3-4 mm. in diameter, opening by valves. Of South American origin, naturalised in many countries, not common in the A.C.T.; also Queensland to Victoria, eastern New Guinea, and New Zealand. 'Scour Weed'. Fig. 110.

**S. micranthum* Cav.

ORCHIDACEAE

Note: 'Stem bracts' excludes the bract immediately subtending the inflorescence or flower.

1. Flowers arranged on the stem so that the labellum lies above the column.

2. Robust leafless plant, usually over 30 cm. high, the stem thick and \pm fleshy with a few short adpressed truncate scale-like bracts; perianth segments united for most of their length, forming a tube 10-16 mm. long which is inflated in the proximal half and split for about $\frac{1}{2}$ its length along the upper side (between the lateral sepals).

1. *Gastrodia*

2a. Leaf solitary, terete or, if undeveloped at flowering time, then the plants slender and small-flowered and the perianth segments free, except the lateral sepals sometimes variously united.

2. *Prasophyllum*

1a. Flowers arranged on the stem so that the labellum lies below the column.

3. Robust leafless plant 25-65 (-90) cm. high, the stem rather fleshy, with coarse close-set scales at and below ground level and several sub-acute scale-like bracts distant along the stem; flowers showy, usually bright pink and \pm spotted, the perianth segments all free and excepting the labellum, similar in size and shape.

3. *Dipodium*

- 3a. Normal green leaves present, or if undeveloped on flowering stems then either the dorsal sepal and petals are connivent to form a prominent 'hood' (in *Pterostylis*), or the plants are very slender and the horizontal or deflexed sepals are conspicuously larger than the other perianth segments (in *Eriochilus*).
- 4. Leaf solitary (sometimes \pm undeveloped on flowering stems in *Eriochilus*), stem bracts absent.
- 5. Leaf terete, long and narrow, sheathing the stem for about $\frac{1}{2}$ its length; flowers small, green and relatively inconspicuous.

4. *Microtis*

- 5a. Leaf flat, ovate or cordate, less than 3 times as long as wide.
- 6. Flower solitary and almost sessile on the heart-shaped leaf; dorsal sepal hood-shaped, the base rather closely applied to the \pm tubular base of the labellum, the apical portion of which is reflexed and broadly oval with fringed or serrulate margins (in A.C.T. species); petals and lateral sepals filiform and rudimentary.

5. *Corybas*

- 6a. Flowers on a long thin stem.
- 7. Leaf ovate, usually \pm undeveloped on flowering stems; lateral sepals white or pink, conspicuously larger than the other perianth segments, horizontally spreading or deflexed.

6. *Eriochilus*

- 7a. Leaf broad and conspicuously heart-shaped, always fully developed at flowering time; lateral sepals not petaloid, subequal in length to the dorsal sepal.

7. *Acianthus*

- 4a. Not as above; either leaves more than one or if leaf solitary or absent from flowering stems then one or more stem bracts present.
- 8. Leaf single, radical, \pm hairy (in A.C.T. species), always present on flowering stems.
- 9. Labellum shortly clawed, usually \pm 3-lobed and/or the margin fringed; stalked and/or sessile calli present on the lamina.

8. *Caladenia*

- 9a. Labellum sessile, ovate-lanceolate, the margin entire; a single large 2-headed stalked callus at the very base (in A.C.T. species) but otherwise the lamina devoid of calli, only 2 white pubescent raised bosses at the base, the apex purple and glabrous.

9. *Glossodia*

- 8a. Not as above; if leaf single then glabrous, or leaves more than one, or (in some species of *Pterostylis*) radical leaves absent from flowering stems.
- 10. Flowers small (all perianth segments less than 5 mm. long), bright pink and white, subtended by minutely pubescent bracts, numerous and closely arranged in a spirally twisted spike.

10. *Spiranthes*

- 10a. Flowers not as above, usually large and single or few in the racemes, or if small and numerous (in *Pterostylis mutica* and *P. cynnocephala*) then the flowers green and the subtending bracts glabrous.
- 11. Petals ovate and coloured in the upper part, abruptly constricted into narrow dark or green linear claws below, often backwardly spreading above the dorsal sepal.

11. *Diuris*

- 11a. Petals not constricted into linear claws.
- 12. Labellum with conspicuous dark stalked and/or sessile calli or densely covered with long \pm iridescent hairs (in A.C.T. species).

13. Labellum subequal to the dorsal sepal; leaves always 2 with ovate or elliptic laminae.

12. *Chiloglottis*

13a. Labellum conspicuously longer than the other perianth segments (\pm twice the length of the dorsal sepal); leaf and often the basal stem bracts long and narrow (in A.C.T. species).

13. *Calochilus*

12a. Labellum not as above, glabrous, shortly papillose-pubescent, shortly white-hispid or with few sparse white hairs.

14. Perianth \pm actinomorphic, the labellum usually quite similar in size and shape to the other perianth segments (except slightly differentiated in *T. venosa*); leaf long and narrow, sheathing the stem at the base, always present on flowering stems.

14. *Thelymitra*

14a. Perianth zygomorphic, the labellum conspicuously different from the other perianth segments; petals connivent with the dorsal sepal to form a prominent hood (the galea); radical leaves absent from flowering stems in some species.

15. *Pterostylis*

1. *GASTRODIA* R.Br. See McLennan (1959)

Robust saprophyte with swollen underground tubers and thick fleshy red-brown stems up to 1 metre high and 10 mm. diameter; flowers cinnamon brown, pale distally, white inside, gibbous in the proximal half, \pm pendulous in a loose terminal raceme; labellum slightly shorter than the fused sepals and petals, the lamina broadly oblong with a central longitudinal ridge bordered with calli and ending in sessile yellow glands distally, the margin undulate, crisped and lacerate. Not common; in leaf litter under Snow Gums, intermediate and high altitudes, near Mt Ginini bog, vicinity Mt Franklin, Little Bimberi Creek, Upper Cotter; also south-eastern Queensland, New South Wales, Victoria, Tasmania, South Australia, Western Australia (far south-west), and New Zealand. 'Potato Orchid', 'Cinnamon Bells'.

G. sesamoides R.Br.

2. *PRASOPHYLLUM* R.Br.

1. Leaf fully developed at flowering time (sometimes \pm withered distally); labellum sessile or on a very short rigid claw.

Group 1

1a. Leaf absent at flowering time; labellum articulate on a short movable claw.

Group 2

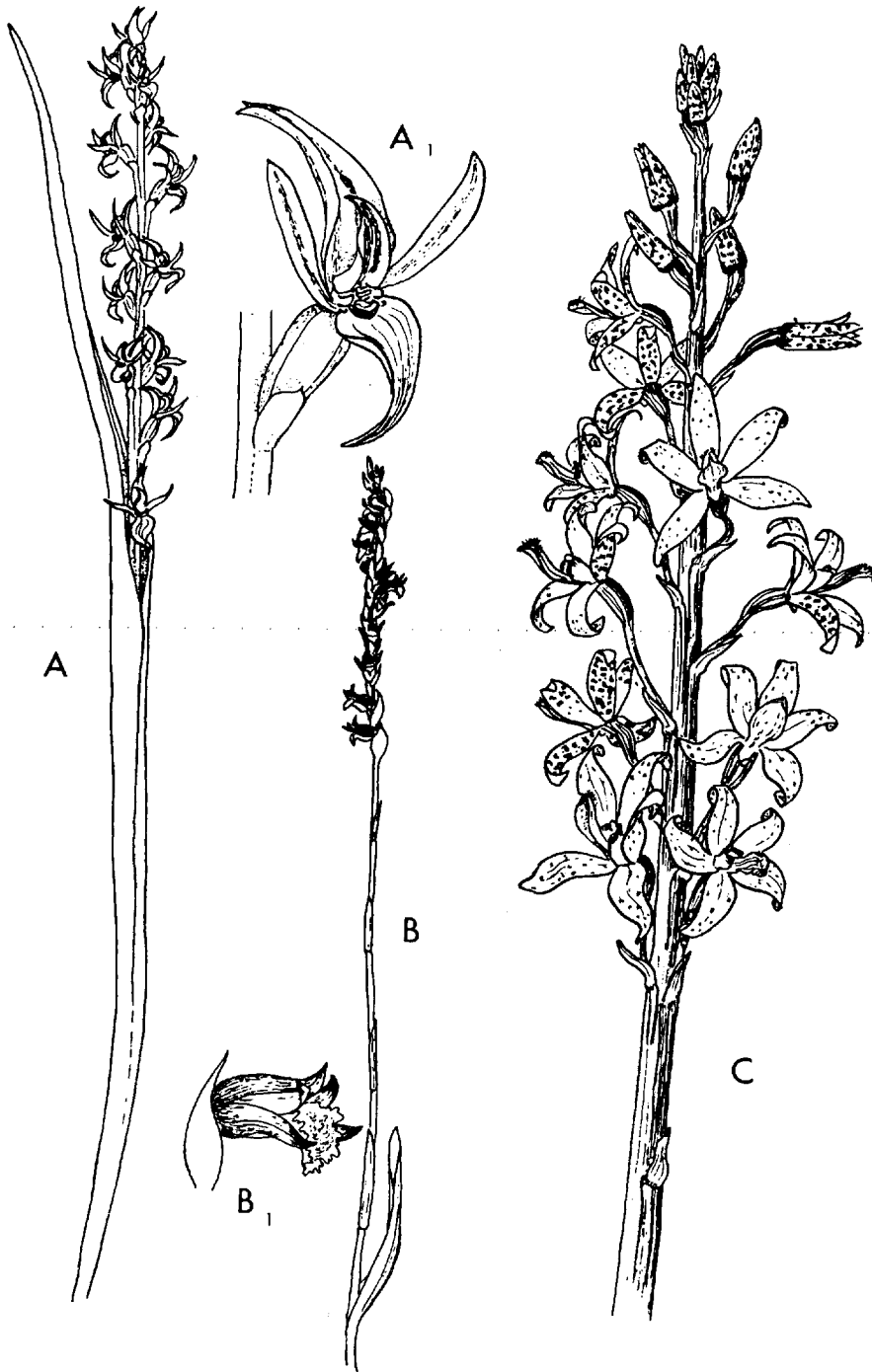
Group 1

1. Labellum with conspicuous broad, white, crisped and undulate margins.

2. Labellum obtuse, abruptly reflexed so that the distal half lies almost parallel to and \pm touching the proximal half, not protruding through the lateral sepals; callus extending well beyond the bend towards the tip; lateral sepals about 9 mm. long, subparallel and connate for all or part of their length, brownish-green sometimes tinged with red, narrowly white-margined distally; mostly tall plants 30-45 cm. high with a dark red-brown stem, the leaf usually sheathing the stem for more than $\frac{1}{2}$ its length and not overtopping the inflorescence; flowers October-December. Not common, plants often solitary or a few together, dry sclerophyll forest, intermediate and low altitudes, Black Mountain, Lee's Creek, Upper Cotter Valley; also south-eastern Queensland, New South Wales, Victoria, and Tasmania.

1. *P. brevilabre* (Lindl.) J. D.

Hook.



111. A. *Prasophyllum alpinum*
 B. *Spiranthes sinensis*
 C. *Dipodium punctatum*

2a. *Labellum recurved to form an angle of about 60-90°.*

3. Petals \pm 7 mm. long, oblong or narrowly spatulate, *subobtuse, predominantly white*, usually tinged with pink or mauve, *the margins undulate*; lateral sepals blunt, usually connate, occasionally \pm free but then remaining sub-parallel; labellum obtuse, \pm 8 \times 4 mm., on a very short claw, recurved to form an angle of about 60°, not protruding between the lateral sepals; callus ending obtusely just beyond the bend of the labellum; sturdy plants usually 20-40 (-60) cm. high, the leaf overtopping or shorter than the inflorescence. Alpine humus soils, in and around boggy flats and sphagnum swamps; fairly common at upper-intermediate and high altitudes, Brindabella and Bimberi Ranges, Corin Dam road near Gibraltar Creek; also New South Wales (Alps), Victoria, Tasmania, and New Zealand (North Island). 'Mauve Leek-orchid'.

2. *P. suttonii* R. S. Rogers et Rees

3a. *Petals predominantly pale green, 7-8 mm. long, linear or narrow-lanceolate, \pm acute, the margins not undulate*; labellum acute, recurved about the middle to about 90°, its tip at length protruding between the widely divergent free lateral sepals, the callus not extending much beyond the bend; dorsal sepal \pm 9 mm. long; lateral sepals pale green with diffuse pale-brown markings; graceful plant 15-40 cm. high (in the A.C.T.), the olive-green and white flowers are sweetly lemon-scented; flowers October-November. Not common, Lee's Creek at about 2500 ft; also southern Queensland, New South Wales, Victoria, South Australia, and Tasmania. 'Sweet Leek-orchid'.

3. *P. odoratum* R. S. Rogers

1a. *Labellum margins not as above, sometimes slightly undulate only.*

4. *Lateral sepals united at least in the lower $\frac{1}{3}$.*

5. Robust plant, usually 20-30 (-40) cm. high, the leaf over-topping or shorter than the inflorescence; flowers yellowish-green, usually \pm suffused with red-brown or dark brownish-red; dorsal sepal about 5-8 mm. long, often at length \pm recurved backwards; petals acute, linear or narrowly triangular, 4-7 mm. long; lateral sepals gently recurved, *usually united for at least $\frac{1}{2}$ their length*, labellum about 4-5 (-6) \times 2-3 mm. (when straightened), recurved about the middle at an angle of about 90°, almost orbicular in the proximal half, constricted at the bend and narrowly triangular distally, the prominent raised callus extending well beyond the bend, usually almost to the tip; *rostellum inconspicuous*, emarginate; flowers December-February. Common at high altitudes, on grassy slopes or around the margins of sphagnum swamps, e.g. Brindabella and Bimberi Ranges; also New South Wales (Kosciusko region), Victoria, and Tasmania. 'Alpine Leek-orchid'. Fig. 111 A-A₁.

4. *P. alpinum* R.Br.

5a. Robust plant, usually 30-40 cm. high; flowers numerous, sometimes faintly lemon-scented, yellowish-green usually suffused with mauve or brownish-red; dorsal sepal 8-11 mm. long, *lateral sepals usually united proximally for up to $\frac{1}{3}$ of their length*, gently recurved distally; petals linear or narrowly triangular, acute, 8-10 mm. long; labellum sessile 7-9.5 \times 4-5 mm. (straightened), broadly elliptical to \pm orbicular in the proximal half, becoming narrowly triangular distally, with a whitish or pale pink slightly undulate margin, recurved at an angle of up to 90° and sometimes shortly protruding between the lateral sepals; callus thick and prominent, reaching almost to the tip of the labellum; column wings obtuse, broad-oblong, with an obscure dorsal lobe proximally; *rostellum prominent*, emarginate; flowers January-February. Locally common in Snow Gum woodland at high altitudes on the Brindabella Range, e.g. Mt Franklin, near the chalet, and Murray's Gap; also New South Wales, Victoria, and Tasmania.

5. *P. frenchii* F. Muell.

Note: This species may be conspecific with *P. gracile* R. S. Rogers (see Willis (1962). *Handbook to Plants in Victoria* 1: 376).

4a. *Lateral sepals free throughout their entire length* in mature flowers; dorsal sepal ± 6 mm. long; petals linear to very narrowly spatulate, ± 5 mm. long; labellum subsessile, ± 5 mm. long, the callus extending almost to the tip; graceful plants to 35 cm. high. Not common, once collected at Hall Cemetery; also New South Wales, Victoria, and Tasmania.

6. *P. fuscum* R.Br.

Group 2

See Rupp (1948)

1. Slender erect plant usually 20-30 (-40) cm. high (in the A.C.T.); flowers small in a short congested spike 2-3 cm. long, the ovaries at length much elongated and prominent; dorsal sepal cucullate, 2-2.5 mm. long minutely apiculate or gland-tipped distally; petals narrowly triangular, 1.5-2 mm. long, apiculate; labellum dull red, 1-1.5 mm. long, *broadly ovate or oblong, truncate proximally*, the margin \pm recurved, very shortly ciliate; callus thick and prominent, minutely papillose, covering most of the labellum surface except for the relatively narrow \pm recurved margin, grooved proximally; lateral sepals 2-3 mm. long, gland-tipped, very shortly united at the base then widely divergent, the margins incurved distally; column wings ± 1 mm. long, divided into two subequal lobes, the adaxial lobe usually glabrous and paler than the minutely ciliate abaxial lobe; flowers February-March. Vicinity Shannon's Flat, Piccadilly Circus, wet sclerophyll forest at about 4000 ft; also New South Wales, Victoria, and Tasmania.

7. *P. beagleholei* Nicholls

1a. Labellum *angular-obovate* or rhomboid, the lamina conspicuously wider than the callus in the distal half.

2. Slender plant 15-25 (-30) cm. high; flowers small, pale green with dark red markings, in a short spike 2-5 cm. long; dorsal sepal cucullate, 2-3 mm. long, distally acuminate; *lateral sepals 3-4 mm. long*, free almost to the base, widely divergent, with or without terminal glands; labellum angular-obovate, 2-2.5 mm. long, deep red, the acute apex shortly recurved, the *margin minutely serrulate occasionally becoming very shortly ciliate distally*; callus thick and prominent, narrow-oblong or lanceolate, furrowed proximally, not quite reaching to the tip of the labellum; petals ± 2 mm. long, narrowly triangular, minutely apiculate distally; column wings glabrous (sometimes very minute marginal trichomes on abaxial lobe) ± 1 mm. long, 2-lobed, the adaxial lobe usually shorter and paler than the acute abaxial lobe; flowers February-March. Black Mountain, very sparsely distributed but sometimes locally common; also New South Wales.

8. *P. rufum* R.Br.

2a. Slender plant 15-20 cm. high (in the A.C.T.); flowers green or yellowish-green with red markings, or wholly deep maroon at high altitudes, in a short \pm condensed spike; dorsal sepal 3-5 mm. long, ovate-acuminate; *lateral sepals ± 5 mm. long*, widely divergent, scarcely united proximally; petals acuminate, 3-4 mm. long; labellum usually angular-obovate or rhomboid, 3-4 mm. long, distally acute or shortly acuminate, recurved and at length shortly protruding between the lateral sepals, *fringed with long conspicuous mauve or pale purple cilia* except in the proximal third; callus thick with a median furrow, \pm covering the proximal $\frac{1}{3}$ of the lamina, narrowed about the middle and extending almost to the tip of the labellum; column wings $\pm 2 \times 1$ mm., distally bidentate, minutely ciliate on the abaxial margin. Black Mountain in dry sclerophyll forest (March), Snowy Flats (Mt Gingera) in sphagnum swamp (December); not common; Queensland to Tasmania and South Australia.

9. *P. archeri* J. D. Hook.

3. DIPODIUM R.Br.

A very variable species; sepals and petals ± 1.5 cm. long (in the A.C.T.); labellum ± 1.5 cm. long, 3-lobed, the lateral lobes linear or narrowly oblong, $\pm 4.5 \times 1$ mm. the large terminal lobe broadly lanceolate, narrowly rhombic or broadly elliptic, $8-10 \times 4-6$ mm., lamina with two pubescent longitudinal ridges distally (between the lateral lobes) and a pubescent keel extending the full length of the large terminal lobe which is pubescent towards the tip; flowers December-February. Fairly common but sparsely distributed at low and intermediate altitudes; Vanity's Crossing, Cotter River, Tidbinbilla area, Glendale Crossing, Gudgenby River, etc.; a rare form with greenish-yellow flowers and very narrow perianth segments needs further study; also Queensland to Tasmania and South Australia. 'Hyacinth Orchid'. Fig. 111C.

D. punctatum (J. E. Sm.) R.Br.

4. MICROTIS R.Br. See Nicholls (1949)

1. Slender herb usually 20-30 cm. high, the spike (2-) 5-12 cm. long; dorsal sepal cucullate ± 2.0 mm. long; lateral sepals recurved or revolute, $1.8-2.0 \times \pm 0.8$ mm.; petals $1.2-1.5 \times \pm 0.4$ mm.; labellum $1.4-1.6$ mm. long, *obtuse or subacute distally, the margins entire or slightly crenulate*, 2 cushion-like glands in the proximal half and *usually a rather diffuse \pm papillose thickening towards the tip (best seen in fresh material), but not a well-defined gland as in the following spp.*; flowers October-January. Usually in wet seepage areas in grassland, Eucalypt woodland or dry sclerophyll forest at low altitudes e.g. lower slopes of Black Mountain, Long Gully Lane; also temperate Australia, Tasmania and north to China. Fig. 112A-A₃.

1. M. parviflora R.Br.

1a. Similar to the above in general appearance, but *labellum truncate or emarginate distally, the margins conspicuously crisped and undulate*, 2 cushion-like glands in the proximal portion, and a *well-defined papillose gland towards the tip*.

2. Slender herb (15-) 25-40 (-60) cm. high, the flowers usually slightly larger than in *M. parviflora*; spike (2-) 5-12 cm. long, *compact with flowers closely arranged*; dorsal sepal $2.2-4$ mm. long; petals $1.4-1.6$ mm. long, *suberect and partly included in the cucullate dorsal sepal*; labellum *oblong, ± 1.8 mm. long*; similar habitats to the above and often growing with it; flowers October-January. Common at low and intermediate altitudes, Black Mountain area, Hall, Paddy's River area, Fishing Gap Tidbinbilla; also temperate Australia, Tasmania, New Zealand, north to China and Japan.

2. M. unifolia (G. Forst.)

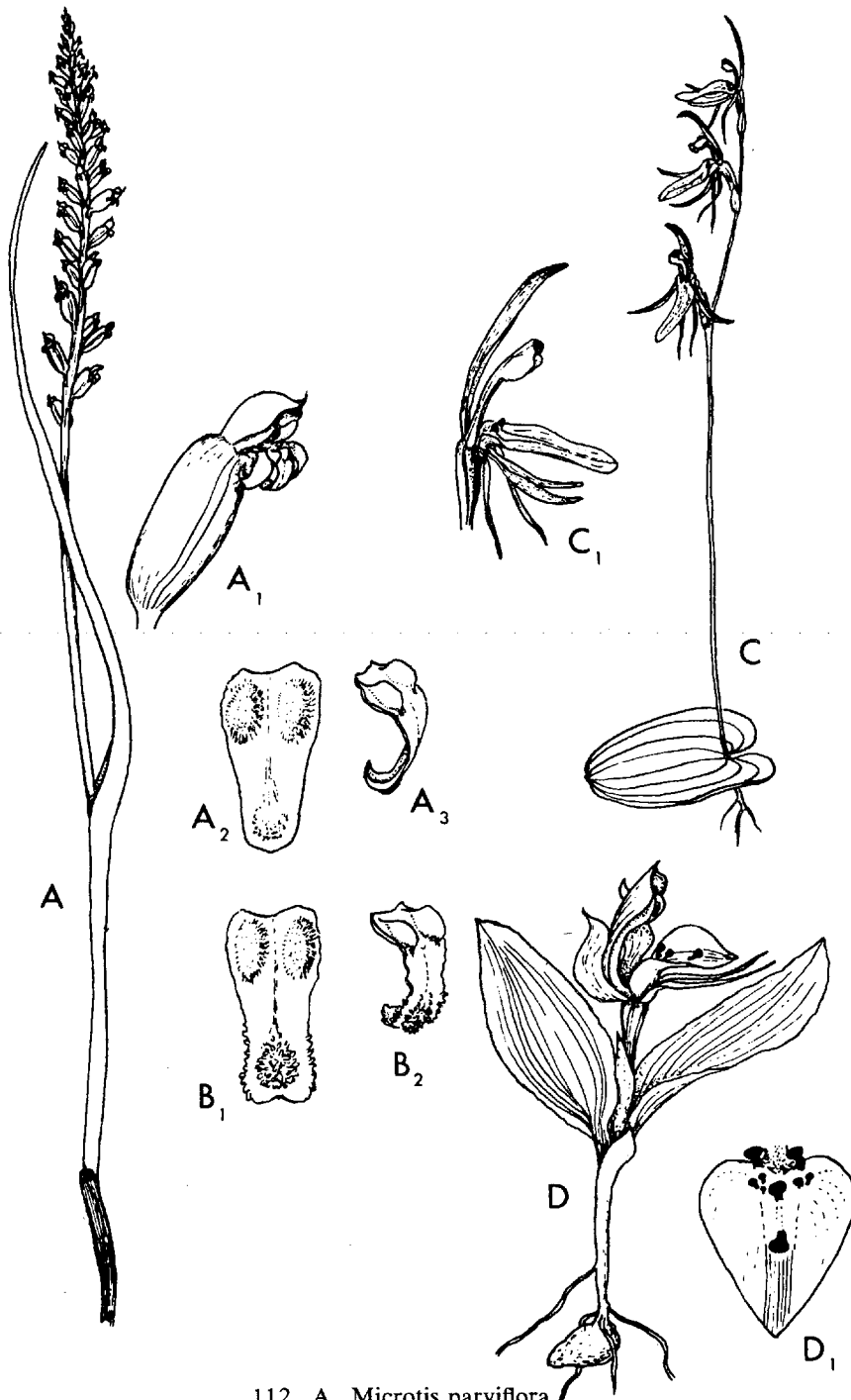
Reichenb. f.

2a. Similar to attenuate plants of *M. unifolia* but *flowers rather distant on a slender spike; labellum narrowly oblong, 2 mm. or more long; petals ± 2 mm. long, spreading, and not included in the cucullate dorsal sepal*; once collected in the A.C.T., Black Mountain, grassy places, flowering December; also south-eastern Queensland to Tasmania and South Australia.

3. M. oblonga R. S. Rogers

5. CORYBAS Salisb. See Rupp and Nicholls (1928)

1. *Lamina of labellum with minutely denticulate margin which remains conspicuously incurved all round and pouch-like at maturity*, dark red or reddish purple, projecting forward and sub-equal in length to the tube, the central area well-defined, white or cream-coloured, surrounded by minute red acute papillae; auricles at base of tube prominent; dorsal sepal grey or pale green usually finely flecked with red; flower small and compact, less than 1 cm. wide (in A.C.T. specimens). Intermediate altitudes but not common; Mt Tidbinbilla area, small groups of 30-40 near fallen log, Vanity's Crossing, Cotter River, between Vanity's



112. A. *Microtis parviflora*
 B. *Microtis unifolia*
 C. *Acianthus reniformis*
 D. *Chiloglottis gunnii*

Crossing and Lee's Creek road; also New South Wales, Victoria, South Australia, and Tasmania. 'Pouched Helmet-orchid', 'Slaty Helmet-orchid'. Fig. 113E.

1. *C. diemenicus* (Lindl.) Rupp

1a. *Lamina of labellum with conspicuously fimbriate or coarsely denticulate margin which is open and spreading at maturity (except remaining pouch-like distally in C. fimbriatus), ± reflexed against the tube.*

2. *Lamina of labellum distinctly longer than the tube, the margin conspicuously fimbriate and ± spreading at maturity except remaining intumed towards the tip of the labellum; central area of labellum white or cream-coloured, not well-defined, the margin spotted and blotched with red, the fimbriae often darker; auricles at base of tube usually prominent; dorsal sepal broadly cuneate, spotted and blotched with red or reddish purple; flowers variable in size, often up to 2 cm. wide or larger (becoming the largest of the genus in Australia). Small groups in leaf litter in sheltered places, often under grass tufts or fallen logs; intermediate altitudes, locally common but shy-flowering; Mt Tidbinbilla area, near junction of Blundell's Creek road and Lee's Creek road; also Queensland to Tasmania. 'Fringed Helmet-orchid'. Fig. 113D.*

2. *C. fimbriatus* (R.Br.)

Reichenb. f.

2a. *Lamina of labellum shorter than the tube, widely gaping, the margin coarsely denticulate; central area of labellum cream-coloured, convex or sub-bulbous and projecting, the transparent margin finely spotted and conspicuously rayed with red; auricles at base of tube prominent with 2 small dark patches on the inside of the tube immediately above them; dorsal sepal broadly cuneate, densely red-spotted and blotched; flowers ± 1-1.5 cm. wide. Intermediate altitudes, not common; Lee's Creek; also Victoria, Tasmania, South Australia, and Western Australia. 'Veined Helmet-orchid', 'Toothed Helmet-orchid'. Fig. 113C.*

3. *C. dilatatus* (Rupp et Nicholls

Rupp

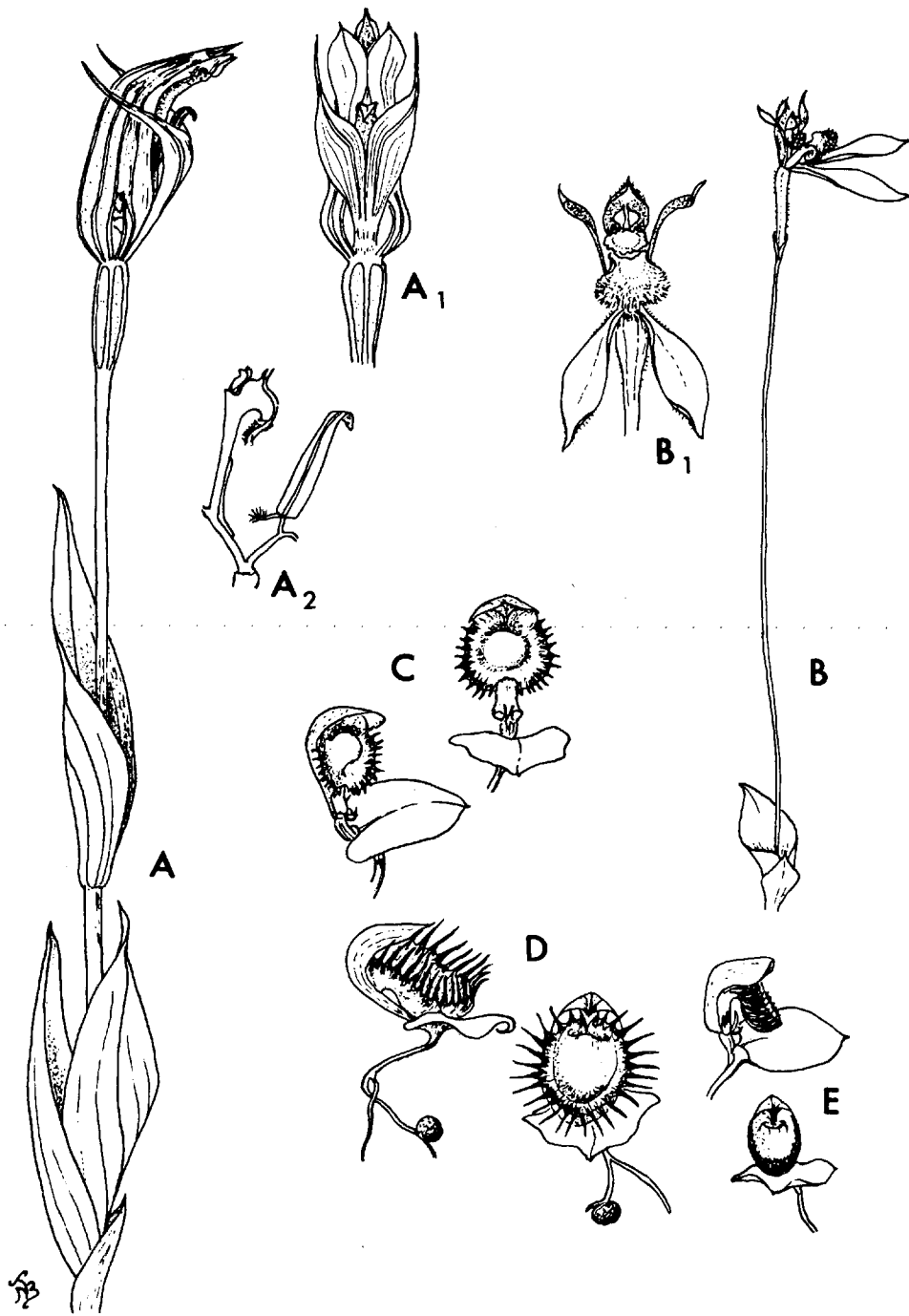
6. *ERIOCHILUS* R.Br.

Slender glandular-hairy herb (rarely almost glabrous), 5-20 (-38) cm. high, with a globular underground tuber; leaf radical, sheathing at the base, ± enclosed by a hyaline sheathing bract; flowers 1-3, white or pink, each subtended by a short obtuse or truncate bract; column 5-8 mm. long, subequal to or slightly shorter than the erect dorsal sepal; lateral sepals very conspicuous, 9-17 mm. long, horizontally spreading or deflexed; petals linear, suberect 5-7 mm. long; labellum 6-8 mm. long (straightened), consisting of a suberect oblong glabrous claw, usually with 2 minute distal lobes, and a recurved broadly elliptic or narrowly trapezoid lamina which is densely pubescent with papillae (sometimes arranged in obscure transverse bands); flowers February-March. Fairly common but sparsely distributed at all altitudes in the A.C.T.; also Queensland, New South Wales, Victoria, Tasmania, and South Australia. 'Parson's Bands'. Fig. 113B.

E. cucullatus (Labill.) Reichenb. f.

7. *ACIANTHUS* R.Br.

1. *Petals and lateral sepals linear and subequal, ± 8-10 mm. long, the lateral sepals without glandular tips; column with a minute appressed obtuse spur on each side at the base, ± 5-6 mm. long, rather abruptly bent forward about the middle, wings developed, expanded below the anther; labellum sessile with 2 prominent calli near the base and 2 ± obscure parallel ridges along the middle, ± 8-10 mm. long, broadly oblong, obtuse distally; leaf reniform, about as broad as long, usually rounded at the apex, pale green or hoary on the underside, usually not or only slightly raised above ground level at flowering time. Black Mountain, western slope, damp rocky slope in sheltered gully and wet gully on southern end, near edge of*



113. A. *Pterostylis alpina*
 B. *Eriochilus cucullata*
 C. *Corybas dilatatus*
 D. *Corybas fimbriatus*
 E. *Corybas diemenicus*

small creek, Mt Tennent, fairly open rocky moss-covered areas on slopes to creeks, locally common in restricted areas but very shy-flowering; low and intermediate altitudes; also south-eastern Queensland to Tasmania, South Australia, Western Australia, and New Zealand. 'Mosquito Orchid'. Fig. 112C-C₁.

1. *A. reniformis* (R.Br.) Schlechter

1a. *Petals narrowly deltoid, only about ½ the length of the linear gland-tipped lateral sepals, usually reflexed or spreading; column ± 2-3 mm. long, gently curving, wings absent; labellum ± 4-6 mm. long, broadly oblong-lanceolate or deltoid, the apex acute and shortly deflexed, glabrous or minutely papillose distally and 2 prominent cushion-like glands at its junction with the column base; leaf heart-shaped, usually longer than wide, broadly deltoid-acute at the apex, usually purple on the underside and conspicuously raised above ground level at flowering time. Black Mountain, Tidbinbilla Range, rocky slopes in sclerophyll forest, often in the shade of shrubs or logs; sometimes locally common in restricted areas but very shy-flowering; low and intermediate altitudes; also south-eastern Queensland to Tasmania and South Australia. 'Gnat Orchid'.*

2. *A. exsertus* R.Br.

8. *CALADENIA* R.Br.

Note: Measurements of perianth are taken with the segments straightened.

1. *Perianth segments narrowed into long filiform caudae or long-acuminate, usually more than 2.5 cm. long; 2 conspicuous yellow sessile glands at the base of the column on the inside (except in C. filamentosa).*

Group 1

1a. *Perianth segments acute or obtuse, usually less than 2 cm. long; column without yellow sessile glands at the base.*

Group 2

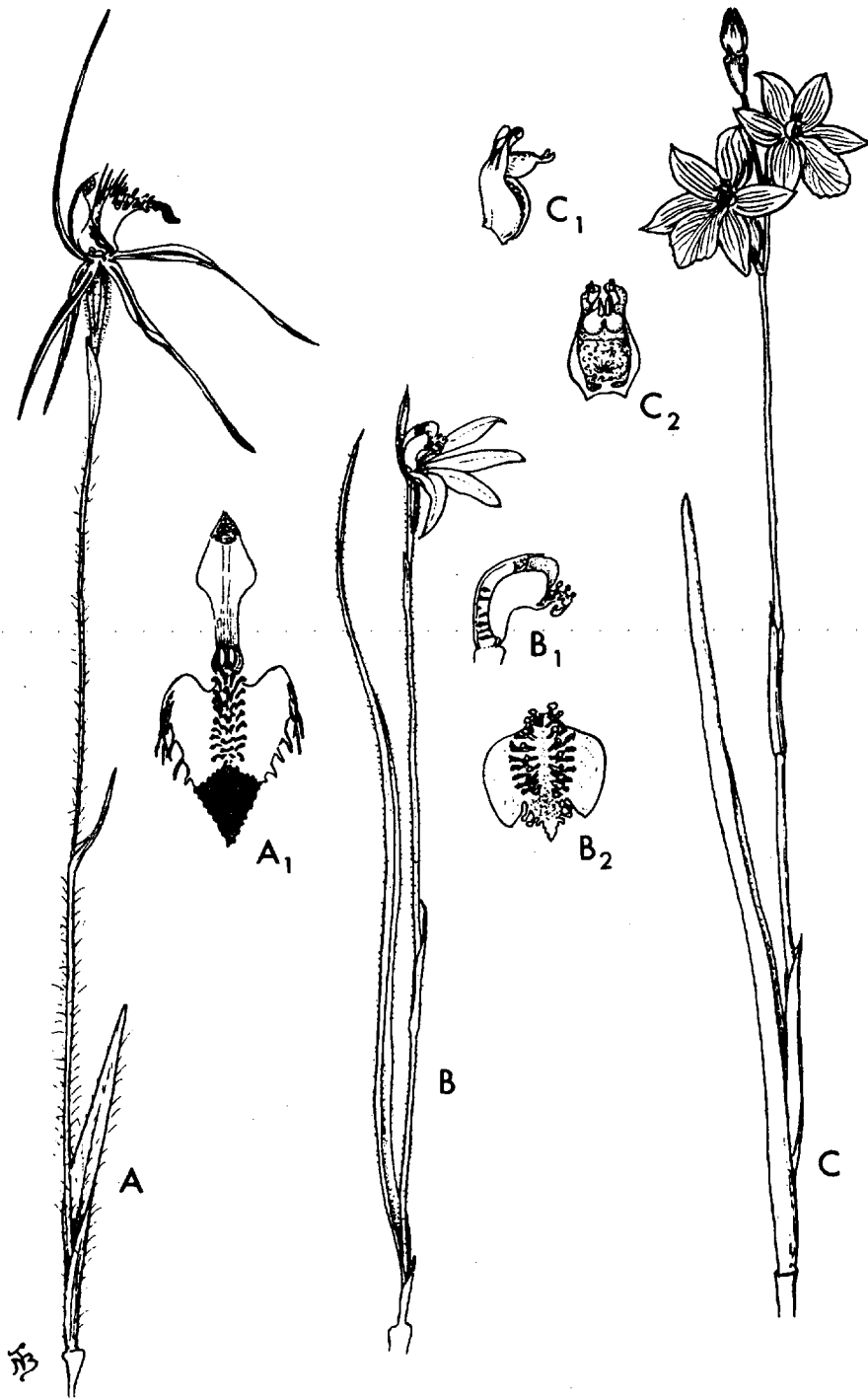
Group 1

1. *Graceful plant 15-25 (-30) cm. high, the stem and leaf very hairy with long white spreading acicular hairs and shorter glandular hairs; flowers 1-2, variable in colour but deep crimson in A.C.T. specimens; sepals and petals 4-6 cm. long (in A.C.T.) without linear terminal glands, very attenuate with long almost capillary caudae which are densely covered with minute spreading finger-like cilia; labellum shortly clawed, undivided, ovate or almost cordate, ± 4-6 mm. wide, the margins dentate or serrate about the middle, the tip recurved; calli in 2 rows, ± flat-topped, extending to about the middle of the labellum; column sometimes glandular, widely winged distally, without sessile yellow glands at the base. To date only known from the Upper Cotter road towards Bendora Dam at about 2400 ft, wet sclerophyll forest; also in New South Wales, Victoria, South Australia, Western Australia, and Tasmania.*

1. *C. filamentosa* R.Br.

1a. *Column with 2 conspicuous yellow sessile glands at the base; calli in 4 rows; linear terminal glands of the sepals usually well-developed.*

2. *Labellum conspicuously 3-lobed, ± as wide or wider than long, the lateral lobes broadly falcate and fringed in front with long comb-like teeth (up to ± 5 mm. long); calli and mid-lobe usually deep maroon, the remainder of the labellum yellowish-green; calli ± 4-rowed, on long thin stalks (especially those towards the base of the labellum), gammate, the apex short; mid-lobe without calli, the margin shortly denticulate; column ± evenly curving through an angle of ± 90°, 10-15 mm. long, the wings narrow in the lower half then ± abruptly expanded below the anther; linear terminal glands of the sepals usually well-developed, yellow or yellowish-brown, often more than 5 mm. long; leaf and stem conspicuously hairy with long white septate hairs and short glandular septate hairs towards the upper part of the stem. Stony areas in dry sclerophyll forest, in leaf litter among grasses and shrubs; widespread and locally common at low and intermediate altitudes; Molonglo Gorge, Black Mountain,*



114. A. *Caladenia dilatata*
 B. *Caladenia carnea*
 C. *Thelymitra venosa*

Mt Tennent, Condor Creek, Brindabella and Tidbinbilla Ranges; also south-eastern Queensland to Tasmania, South Australia, and Western Australia. 'Green-comb Spider Orchid'. Fig. 114A-A₁.

2. *C. dilatata* R.Br.

2a. *Labellum ovate-acute, not or only inconspicuously lobed, longer than wide, the margin shortly fringed except at the base and towards the minutely upturned apex, usually maroon and conspicuously veined, paler towards the base; calli not extending to the apical $\frac{1}{3}$ of the labellum, shortly stalked, conspicuously gammate, the apical horizontal portion narrow, sharp-pointed and usually more than $\frac{1}{2}$ the length of the stalk; column suberect, slightly inclined towards the apex, \pm 10-12 mm. long; linear terminal glands of the sepals usually well-developed and dark maroon; leaf and stem conspicuously hairy with long white or ferruginous septate hairs, and short glandular septate hairs towards the upper part of the stem. Dry sclerophyll forest at intermediate altitudes, not common; Tidbinbilla Range, Orroral area, Boboyan, Upper Cotter Valley, Mt Coronet; also Queensland (Wallangarra) to Tasmania, South Australia. 'Veined Spider Orchid'.*

3. *C. reticulata* R. D. FitzG.

Group 2

1. *Flowers bright purple-blue, usually solitary; labellum conspicuously 3-lobed, \pm 6-7 mm. long, purple-blue with reddish-purple transverse bars except for the mid-lobe, lateral lobes large and projecting forward in front, the margins entire and \pm undulate, mid-lobe narrow, golden-yellow, reflexed or recurved; calli with golden-yellow heads, in 2 rows, those on the mid-lobe small and rudimentary, extending almost to the tip; column 6-8 mm. long, the wings minutely spotted; stem short, usually less than 10 cm. long; leaf \pm prostrate, often less than 5 cm. long, narrow-lanceolate or oblong-lanceolate, with short white glandular septate hairs especially above and on the margins, often sub-glabrous on the underside; flowers September-October. Among grasses in dry sclerophyll forest at low altitudes, locally common in very restricted areas; Kowen area, Black Mountain; also south-eastern Queensland, New South Wales, Victoria, and South Australia. 'Blue Caladenia'.*

4. *C. caerulea* R.Br.

1a. *Flowers not as above; leaf erect, usually more than 7 cm. long, or if shorter, then linear-lanceolate or linear.*

2. *Labellum conspicuously 3-lobed.*

3. *Mid-lobe of labellum linear-oblong, \pm as long as the central portion, recurved, completely covered by 2 irregular rows of large congested, dark maroon, sessile cushion-like calli which extend back along the central portion, usually a few stalked calli at the base; lateral lobes strongly projecting forward in front, the margins entire, \pm undulate; column 8-10 mm. long, blotched with red in the lower half; perianth segments acute, pink on the inside; flowers single or few in the raceme; leaf linear with sparse long hairs. Among leaf litter in dry sclerophyll forest at low and intermediate altitudes; rare; Black Mountain, Brindabella road between Five Crossings and Blundell's Flat, Lee's Creek road, Bimberi Range, Yaouk Gap; also Tablelands of New South Wales, Victoria, Tasmania, and South Australia. 'Black-tongue Caladenia'.*

5. *C. congesta* R.Br.

3a. *Mid-lobe of labellum \pm triangular, usually shorter than the central portion, calli not as above, those on the central portion at least always stalked.*

4. *Calli in 2 (sometimes slightly irregular) rows; inside of the column and the central portion of the labellum conspicuously red-barred; lateral lobes of the labellum with entire \pm undulate margins, usually prominently projecting forward in front (in A.C.T. specimens); mid-lobe recurved or reflexed, small and inconspicuous, white or yellowish, the margin*

denticulate; perianth segments pink or white on the inside, the lateral sepals often sub-obtuse with a minute mucro; a very variable species. Low and intermediate altitudes, widespread and fairly common in sclerophyll forest; Molonglo Gorge, Black Mountain, Condor Creek between Five Crossings and Blundell's Flat, Brindabella Range, Orroral area, slopes of Mt Coronet, Upper Cotter Valley; also Queensland to Tasmania, South Australia, New Zealand, and New Caledonia. 'Pink Fingers'. Fig. 114B-B₂.

6. *C. carnea* R.Br.

4a. *Calli arranged in 4 rows*, (usually becoming \pm irregular towards apex of the labellum); *lateral lobes of the labellum not or only slightly projecting forward in front*.

5. *Leaf broad, thick and slightly fleshy, usually more than 5 mm. wide* (sometimes \pm 4 mm.) usually with sparse long septate hairs or \pm glabrous; stem sparsely or densely covered with long patent septate hairs (mostly in the lower portion) and shorter gland-tipped septate hairs; perianth segments steely-white inside, *the lateral sepals close together and projecting forward under the labellum*; inside of column and labellum with conspicuous red blotches which are usually arranged in transverse bars on the labellum; calli with yellow heads, those on the mid-lobe small and irregularly arranged; column widely winged. Fairly common around the margins of sphagnum bogs at high altitudes; Mt Ginini, Mt Gingera, Mt Tidbinbilla; also New South Wales (Kosciusko area), Victoria, Tasmania, and New Zealand. 'Mountain Caladenia'.

7. *C. lyallii* J. D. Hook.

5a. *Leaf narrow and grass-like, less than 4 mm. wide; lateral sepals spreading*.

6. *Calli with rather large mostly deep maroon heads, with a 'prickly' appearance (under a lens), due to numerous minute sharp-pointed papillae; mid-lobe of labellum usually wholly deep maroon, with a dense patch of sub-sessile or sessile calli in the proximal portion, the margin with a few small calli proximally, becoming denticulate towards the apex; plant always with a very pungent sickly-sweet citronella-like odour (in the A.C.T.)*. Distribution not well known because of confusion with following species; Black Mountain area; also New South Wales to Tasmania. 'Hooded Caladenia'. Fig. 115A-A₂.

8. *C. cucullata* R. D. FitzG.

6a. *Calli sometimes rather sparse in the rows, with small yellow or pale maroon (rarely deep maroon) heads, the minute papillae sub-obtuse and not 'prickly' in appearance, those on the mid-lobe becoming small and \pm rudimentary (sometimes absent), not densely arranged but rather a slightly irregular continuation of the rows on the central portion; maroon patch on the mid-lobe variable, usually faint, sometimes absent or if prominent then rarely covering the whole mid-lobe, the margin of which is fringed with minute rudimentary calli except at the apex; plant otherwise rather similar in general appearance to *C. cucullata*, usually with a pungent sickly-sweet musky odour (in the A.C.T.)*. Fairly common among leaf litter and grasses in dry sclerophyll forest, low and intermediate altitudes; Black Mountain, Condor Creek below Blundell's Flat, lower slopes of Brindabella Range, Bull's Head to Bendora Dam road, Lee's Creek; also New South Wales to Tasmania, South Australia. 'Musky Caladenia'. Fig. 115B-B₂.

9. *C. angustata* Lindl.

2a. *Labellum not or only inconspicuously 3-lobed, narrow-ovate, the margins deeply fringed about the middle with small-headed calli on long stalks, these becoming smaller and rudimentary towards the apex; calli on the lamina in 4 rows, with small yellow heads; maroon patch on the mid-lobe variable, usually faint, sometimes dark or absent; usually a smaller plant than the previous two species, the raceme often 1-2(-3)-flowered, odourless or very faintly scented (in the A.C.T.)*. Grassy places in dry sclerophyll forest at low (and inter-

mediate?) altitudes; Black Mountain, Molonglo Gorge; also south coast of New South Wales, and Victoria. Fig. 115C-C₂.

10. *C. praecox* Nicholls

9. *GLOSSODIA* R.Br.

Erect plants 10-35 cm. high, the stem densely covered with short glandular septate hairs, and usually long acicular septate hairs towards the base; leaf 1.5-9 (-15) cm. long, enclosed at the base by a small hyaline sheathing bract, prostrate or ascending, lanceolate, oblong or narrowly ovate, sparsely hairy or almost glabrous on the underside, the upper surface with long acicular septate hairs and/or short glandular septate hairs; flowers usually solitary (sometimes 2-3); sepals and petals similar in size and shape, 1.5-3 cm. long, in shades of purple, blue, or mauve (rarely white), pale on the underside; column widely winged above; flowering September-November. Fairly common at low and intermediate altitudes, Kowen area, Black Mountain, Five Crossings area, Orroral Valley; also south-eastern Queensland, New South Wales, Victoria, South Australia, and Tasmania. 'Wax-lip Orchid'. Fig. 116B-B₂.

G. major R.Br.

10. *SPIRANTHES* L. C. Rich.

Slender plant 15-40 cm. high or more with oblong tubers and/or thick fibrous roots; leaves 3 or more, glabrous, linear or narrow-lanceolate, mostly radical or gradually merging into the stem bracts; flowers small, bright pink and white, spirally arranged in a minutely glandular-pubescent spike, each flower subtended by a pubescent bract; perianth segments subequal, 4-5 mm. long, the dorsal sepal and petals connivent for most of their length to form a shallow hood over the column; labellum shortly clawed, mostly white, oblong-elliptic to obovate, the lamina glabrous, with two ovoid glands proximally, the margins undulate, incurved, distally fringed and crisped; ovary glandular-pubescent; flowering January-March. Wet soakages or swampy areas at low and intermediate altitudes, Black Mountain, Vanity's Crossing, Tidbinbilla Valley, Booroomba; also south-eastern Queensland, New South Wales, Victoria, South Australia, Tasmania, New Zealand, and widespread in South-east Asia, Philippines, Japan etc. 'Ladies Tresses'. Fig. 111B-B₁.

S. sinensis (Pers.) Ames

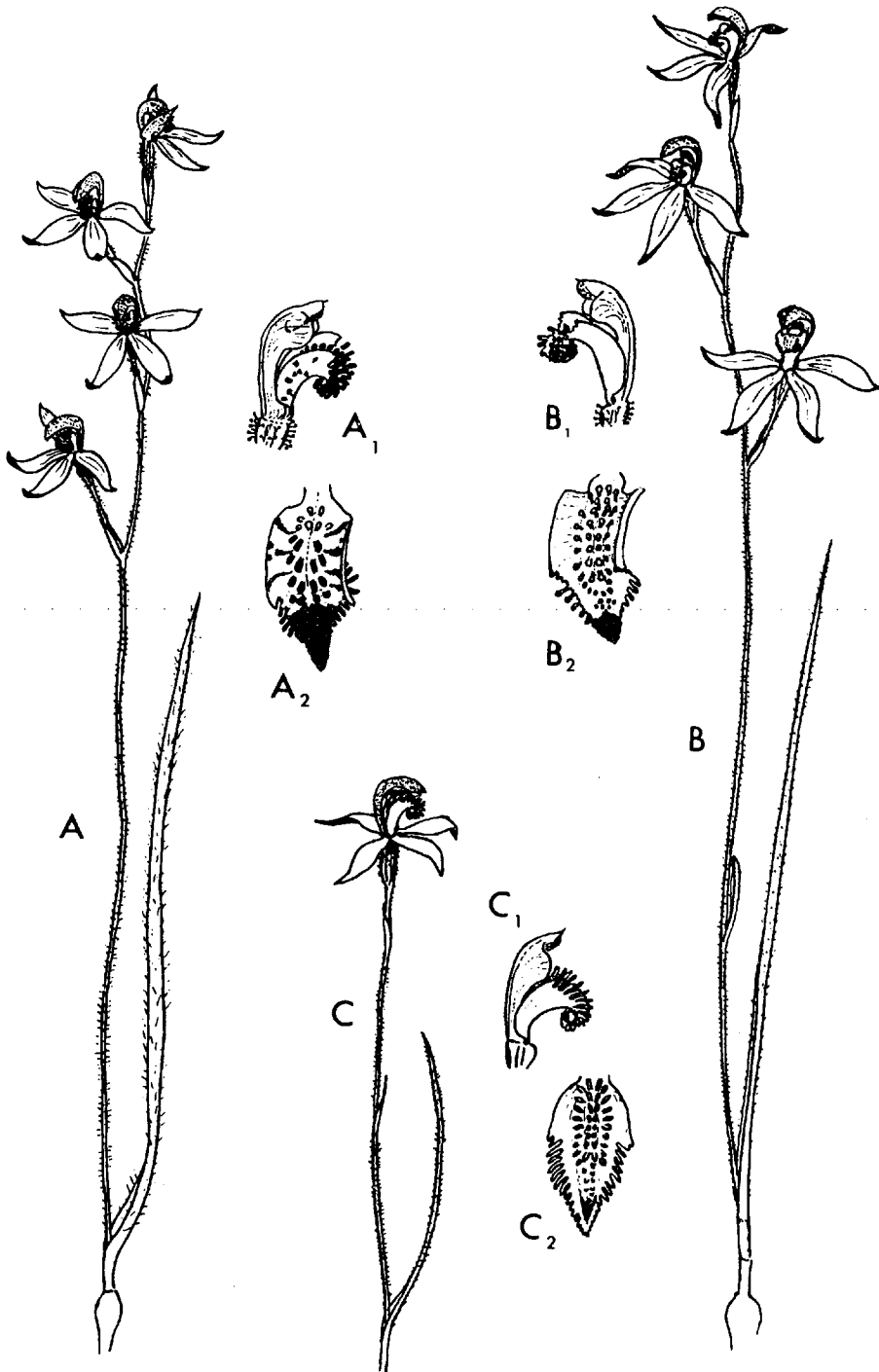
11. *DIURIS* J. E. Sm.

1. Erect often robust herb 15-45 (-80) cm. high, with 1-3 long grass-like leaves; flowers yellow with reddish-brown markings; dorsal sepal at length erect, with a conspicuous dark spot on each side towards the base; petals with ovate or lanceolate yellow laminae and distinct usually dark-coloured claws; lateral sepals about as long as the petals (occasionally sub-petaloid) usually not crossed; lateral lobes of the labellum broad, about $\frac{1}{2}$ as long as the mid-lobe, *the proximal portion between the lateral lobes* variously marked with brown, but *devoid of raised callus plates*, distal portion of the lamina with conspicuous red-brown blotches usually joining to form a broad transverse band; flowers from late October to mid-December. Common throughout the area at low and intermediate altitudes, slopes of Black Mountain, Five Crossings, Lee's Creek, slopes of Mt Bimberi; also Queensland, New South Wales, Victoria, South Australia, and Tasmania. 'Tiger Orchid'. Fig. 117D.

1. *D. sulphurea* R.Br.

1a. *Proximal portion of the labellum between the lateral lobes with 2 prominent sub-parallel or slightly divergent raised callus plates.*

2. Lateral sepals narrow-linear, *more than twice as long as the petals* (5-6 cm. long in the A.C.T. specimen); *flowers pale mauve* with darker blotches and veins; dorsal sepal ovate, about 15 mm. long; labellum 10-12 mm. long, the lateral lobes 4-5 mm. long, broadly oblong, slightly falcate and distally crenulate, the mid-lobe with 2 longitudinal calli on the narrow proximal half, the lamina broadly ovate, distally acute, about as wide as long. Rare



115. A. *Caladenia cucullata*
 B. *Caladenia angustata*
 C. *Caladenia praecox*

in the A.C.T.; near Murrumbidgee River at Cotter Pumping Station, grassland in open woodland; for an account of the variation in this extremely polymorphic species see Dockrill (1964); also Queensland to Victoria and South Australia.

2. *D. punctata* J. E. Sm.

2a. *Lateral sepals subequal to or shorter than the petals* (never twice as long); *flowers yellow or yellow blotched or veined with red-brown.*

3. Graceful plants to 40 cm. high with 2-7 grass-like leaves; flowers 1-4, often nodding, mostly yellow, the dorsal sepal and labellum usually finely striate with red-brown veins proximally; *petals directed forward*, with short green or red-brown claws and lanceolate or narrowly ovate yellow laminae; lateral sepals about as long as or slightly longer than the labellum and remaining close under it, occasionally sub-petalloid and tinged with red; labellum 1.0-1.6 cm. long, the lateral lobes narrowly triangular or oblong, usually dentate distally, *less than ½ the length of the mid-lobe*, the mid-lobe proximally narrow with 2 longitudinal callus plates ending in minute crowded calli, the lamina keeled, ovate or broadly ovate-acute, the central portion and callus plates usually golden-pubescent; flowers September-December. Sparsely distributed but fairly common at all altitudes; wet soakage areas in grassland and margins of swampy areas; Black Mountain, Hall, Upper Cotter district, Mt Gingera; also Queensland, New South Wales, Victoria, South Australia, and Tasmania. 'Golden Moths'. Fig. 117C.

3. *D. pedunculata* R.Br.

3a. *Petals backwardly spreading above the dorsal sepal; lateral lobes of the labellum* variable in shape but *more than ½ the length of the mid-lobe*; flowers usually ± spotted or blotched with red-brown, sometimes almost pure yellow; lateral sepals often crossed in mature flowers; an extremely variable complex common in the A.C.T. and requiring further study; it is obvious from the literature that many of the so-called 'species' in this complex have been described from either occasional hybrid or aberrant individuals, or from plants collected in segregating hybrid swarms. Fig. 117A, B.

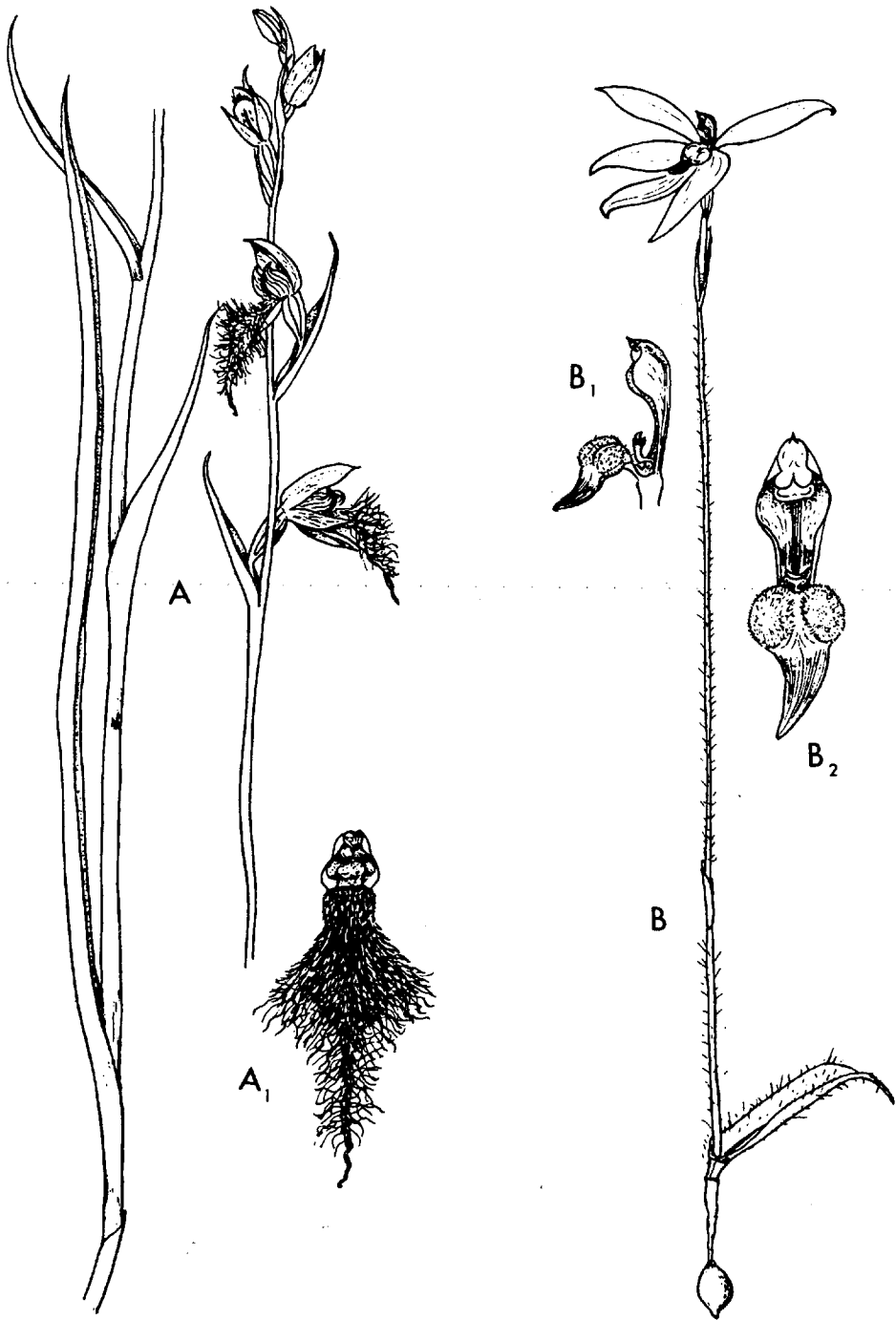
4. *D. maculata* complex

12. *CHILOGLOTTIS* R.Br.

1. *Petals broad, ± 4-7 mm. wide, spreading and suberect*; labellum on a very short broad claw, broadly ovate or heart-shaped, ± as wide as long, widest towards the base; *calli usually very sparsely arranged* (occasionally some tending to be fused together), usually 2(-3) large calli along the mid-vein, the posterior 1 (or 2) stalked, the anterior one ± sessile, the remainder stalked, usually not numerous but sometimes tending to form 2 (rarely 4) ± indistinct lateral rows in the proximal portion of the labellum; flowers ± 2-3 cm. wide (in the A.C.T.), in shades of green and purple-brown, the calli dark and waxy; leaves 2, elliptical to broadly ovate, sessile and stem-clasping or petiolate; stem much elongated after fertilisation. Among leaf litter and/or moss near small creeks or swampy areas, or in sphagnum bogs; sometimes locally common in very restricted areas at intermediate and high altitudes; Lee's Springs, Wombat Road, Cotter Valley, Snowy Flats (Mt Gingera), Tidbinbilla Range; also New South Wales, Victoria and Tasmania. 'Brownies', 'Common Bird Orchid'. Fig. 112D-D₁.

1. *C. gunnii* Lindl.

1a. *Petals narrow, ± 3 mm. wide; deflexed against the ovary; calli clustered and insectiform.*
2. *Petals ± 3 mm. wide, claw of labellum shorter than the lamina, lamina obovate or sub-rhomboid, longer than wide, becoming widest towards the apex then abruptly narrowed to a shortly apiculate deflexed point; calli clustered and insectiform, very dark, lustrous and shining, extending almost the full length of the lamina, near the base of the labellum a large stalked callus which is recurved towards the column and often somewhat bilobed at the*



116. A. *Calochilus robertsonii*
 B. *Glossodia major*

apex, and several large \pm sessile cushion-like calli towards the middle of the lamina, surrounded by numerous small stalked calli which gradually become sessile towards the tip of the labellum; flowers in shades of green and reddish-brown; leaves 2, sessile and stem-clasping or petiolate, the laminae broadly elliptical or ovate; stem much elongated after fertilisation; flowers March-April (in the A.C.T.). Usually in stony areas among grasses (*Poa* spp.) in dry sclerophyll forest, low and intermediate altitudes; not common; Black Mountain, Tidbinbilla Range, Brindabella Range; also Queensland, New South Wales, Victoria, and Tasmania. 'Autumn Bird Orchid'.

2. *C. reflexa* (Labill.) Druce

2a. Similar to *C. reflexa* in general appearance but petals \pm 2 mm. wide; labellum 7-8 \times 6-7 mm., suberect, lying almost parallel to the column, the claw about as long as the lamina which is broadly rhomboid or almost transversely elliptical, *obtuse and wider than long*; calli dark, lustrous and shining, clustered about the junction of claw and lamina *leaving most of the lamina devoid of calli*, 2 large 3-lobed broad calli, separated by a densely clustered group of smaller round cushion-like calli and various smaller calli scattered nearby (the whole group resembling a small fat black ant); lateral sepals linear, falcate and divergent, arranged in the same plane as the labellum; flowering September-October. To date only known from a restricted occurrence in a wet gully at the southern end of Black Mountain, growing with *Pterostylis nutans*; also New South Wales and Victoria.

3. *C. trapeziformis* R. D. FitzG.

13. CALOCHILUS R.Br. See Rupp (1947)

1. *Base of labellum covered with numerous distinct \pm swollen papillae which gradually merge into the long minutely glandular hairs of the lamina*; labellum usually about 2 cm. long, the hairs and papillae iridescent reddish-purple, sometimes becoming paler towards the apex of the labellum which terminates in a narrow, glabrous, crinkled ribbon-like process. Locally common but not widespread, in dry sclerophyll forest, e.g. Black Mountain; also south-eastern Queensland, New South Wales, Victoria, Tasmania, South and Western Australia and New Zealand. 'Purplish Beard Orchid'. Fig. 116A-A₁.

1. *C. robertsonii* Benth.

1a. *Base of labellum without papillae, covered by a broad, flat, lustrous-blue cushion-like callis* which is \pm dissected and lobed in front, or almost completely dissected into oblong plates; labellum usually \pm 1.5 cm. long, the long minutely glandular hairs of the lamina reddish blue, often with a metallic coppery tinge; apex of labellum acuminate or prolonged into a short glabrous ribbon-like process. In dry sclerophyll forest, sometimes growing with the preceding species but much less common; Black Mountain, Mt Tidbinbilla; distribution as for preceding species excluding Western Australia. 'Copper Beard Orchid'.

2. *C. campestris* R.Br.

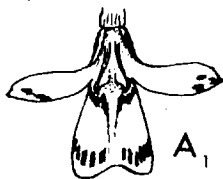
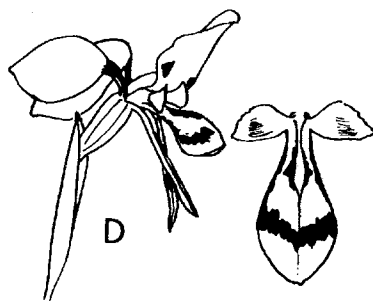
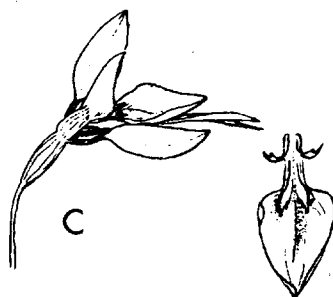
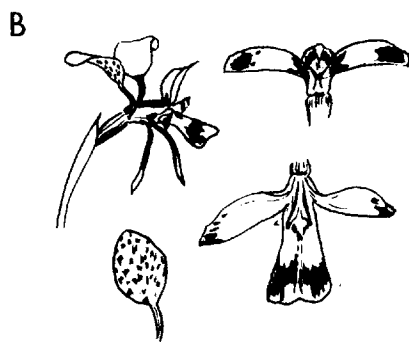
14. THELYMITRA J. R. et G. Forst.

1. Lateral appendages of the column glabrous.

2. *Column appendages erect and spirally coiled*, usually yellow; *perianth segments blue with conspicuous dark veins, about 1.5 cm. long*; labellum slightly differentiated, usually broader than the other perianth segments, with more or less undulate margins and inconspicuous veins; *anther at the summit of the column, the apical appendage bifid*. Brindabella Range, Murray's Gap, Mt Ginini, Mt Franklin; margins of sphagnum swamps and soakages in *Eucalyptus pauciflora* woodland, at high altitudes; also New South Wales to Tasmania, South Australia, and New Zealand. 'Veined Sun Orchid'. Fig. 114C-C₂.

1. *T. venosa* R.Br.

2a. *Column appendages suberect and flat, not spirally coiled*, the margins sometimes slightly denticulate; *perianth segments pink or reddish, usually less than 8 mm. long*, the flowers



117. A., B. *Diuris maculata*
 C. *Diuris pedunculata*
 D. *Diuris sulphurea*

only opening in very hot weather; *apical appendage of the anther entire, not or only slightly extending above the top of the column*. Black Mountain, locally common in dry sclerophyll forest at low altitudes; also New South Wales and New Zealand. 'Pink Sun Orchid'.

2. *T. carnea* R.Br.

1a. Lateral appendages of the column with conspicuous white or yellowish brush-like hairs.

3. *Apex of the column between the lateral appendages irregularly 3-lobed, the broad depressed middle portion crested and dissected into numerous crowded, usually yellow, short finger-like processes*; perianth usually blue (sometimes mauve) and about 9-12 mm. long (in A.C.T. specimens), the upper segments usually spotted on the inside. Black Mountain, Bimberi Creek, Upper Cotter, dry sclerophyll forest at low and intermediate altitudes, locally common but not widespread; all mainland states, Tasmania and New Zealand. 'Spotted Sun Orchid'.

3. *T. ixioides* Swartz

3a. *Apex of the column hooded, the hood shallowly or deeply V-cleft*; perianth segments never spotted.

4. *Column deeply V-cleft at the hooded apex which is suberect* and usually yellow at the top with a dark-coloured band below; lateral appendages of the column suberect with white terminal hair-tufts; perianth segments rather variable in size and colour, usually less than 1 cm. long and pale blue in A.C.T. specimens; flowers opening tardily except in hot weather. Black Mountain, where some plants growing with *T. ixioides* and *T. pauciflora* show intermediate characteristics between the two species; dry sclerophyll forest at low altitudes; all mainland states, Tasmania and New Zealand.

4. *T. pauciflora* R.Br.

4a. *Column (usually) shallowly cleft or subentire at the hooded apex which is curved forwards and slightly projecting in front* and predominantly dark-coloured usually with a yellow tip; lateral appendages of the column horizontal or suberect with dense white or yellowish hair-tufts which are shortly secund along their upper edges; perianth segments variable in size and colour, usually more than 1 cm. long and blue or mauve in A.C.T. specimens; flowers readily opening and usually forming showy, slightly fragrant spikes. Booroomba Station, Tidbinbilla area, Bimberi Creek, Upper Cotter, in dry sclerophyll forest at intermediate altitudes, sparsely distributed; all mainland States, Tasmania and New Zealand. 'Scented Sun Orchid'.

5. *T. aristata* Lindl.

15. *PTEROSTYLIS* R.Br.

Note: Length of galea is measured in a straight line from base to petal tips in fresh material. Length of labellum is measured from the base of the appendage to the labellum tip, with the labellum straightened.

1. *Lateral sepals at length deflexed or spreading, not embracing the galea*; flowers usually racemose (sometimes solitary in *P. longifolia* and *P. rufa* subsp. *aciculiformis*).

Group 1

1a. *Lateral sepals erect or ascending, embracing the galea*; flowers normally solitary (except *P. parviflora*).

Group 2

Group 1

1. *Radical leaves absent at flowering time, upper cauline leaves well-developed and spreading ± 3-8 cm. long, narrow-lanceolate, the midrib prominent, slightly stem-clasping at the base and often subglaucous on the underside*; often tall plants up to 30 cm. high or more; flowers green, the galea and lateral sepals ± 10-15 mm. long; labellum minutely papillose, slightly 3-lobed towards the bifid upturned apex. Damp shaded gullies in sclerophyll forest, low and intermediate altitudes, sparse or locally common; Black Mountain, vicinity Five

Crossings, Wombat Road, Cotter Valley, Tidbinbilla area; also south-eastern Queensland, New South Wales, Victoria, Tasmania, and South Australia. 'Tall Greenhood'.

1. *P. longifolia* R.Br.

1a. *Radical leaves present at flowering time, forming a basal rosette, green or often dried and brown; cauline leaves reduced to ± appressed scarious sheathing bracts.*

2. *Labellum thick and fleshy, with sparse but conspicuous long white marginal hairs, deeply channelled from between 2 basal swellings on the underside, minutely bifid at the apex (in A.C.T. specimens), ± 2.5 mm. long; sepals with short acuminate points 2-3 mm. long; galea 8-10 mm. long, the flowers green usually ± suffused with red or reddish-brown single or up to 5, distant on the raceme. Dry sclerophyll forest, usually in mossy and rocky areas, on wet hillslopes or in gullies near creeks; low and intermediate altitudes; not common; Molonglo Gorge, Black Mountain, Mt Tennent, Booroomba, Gibraltar Falls area; also New South Wales, Victoria, Tasmania, South Australia, and possibly Western Australia. (See Blackmore and Clemesha, 1968.) 'Ruddy-hood'. Fig. 118B-B₁.*

2. *P. rufa* R.Br. subsp. *aciculiformis* (Nicholls) Blackmore et Clemesha

2a. *Labellum glabrous, thin and more or less flattened; sepals short and blunt; galea about 6 (-7) mm. long.*

3. *Apex of labellum appendage with a conspicuous dark 'beak' pointing outwards (towards labellum tip); labellum shortly oblong, almost as wide as long with a very shallow inconspicuous groove on the underside, the apex entire or slightly emarginate; flowers small, green, usually fairly numerous, spirally arranged and somewhat crowded in the raceme; stem often rather thick and fleshy especially at higher altitudes. Usually in moist open areas among short grass and herbs; widespread and fairly common at all altitudes; Kowen area, Black Mountain, Gininderra Falls (N.S.W.), Mt Franklin (summit), Little Mt Ginini, Snowy Flats (Mt Gingera), Upper Orroral Valley, Rendezvous Creek, Gudgenby area; also New South Wales to Tasmania, South Australia and New Zealand. 'Swan Greenhood'. Fig. 118C-C₁.*

3. *P. cyanocephala* R. D. FitzG.

3a. *Labellum appendage recurved at the apex which points inwards (towards the column); otherwise very similar in general appearance to P. cyanocephala, and occurring in similar situations. Not common, often occurs as isolated plants or in groups of only a few together; Molonglo Gorge, Dingo Dell area (N.S.W./A.C.T. border), Five Crossings, Bull's Head to Bendora Dam road, Tidbinbilla Range, Gibraltar Falls area; also south-eastern Queensland, New South Wales to Tasmania, South Australia, Western Australia, and New Zealand. 'Midget Greenhood'.*

4. *P. mutica* R.Br.

Group 2

1. *Radical leaves forming a basal rosette, always encircling the base of the stem at flowering time, the oval or ovate laminae abruptly narrowed to conspicuous petioles; cauline leaves reduced to thin green or scarious somewhat inflated sheathing scales.*

2. *Labellum ovate, 4-6 mm. long, distinctly shorter than the column; galea 1-1.5 cm. long, the horizontal portion usually more or less at right angles to the erect portion, dark red-brown towards the apex; lateral sepals usually acuminate and distinctly overtopping the galea. Always in deeply shaded situations, usually among mosses on wet rocks; fairly common at intermediate altitudes; Lee's Springs, Lee's Creek, Condor Creek between Blundell's Flat and Five Crossings, Wark's road below Bull's Head, slopes of Mt Tidbinbilla,*

Upper Cotter area; also south-eastern Queensland, New South Wales to Tasmania, South Australia. 'Maroon-hood'.

5. *P. pedunculata* R.Br.

2a. *Labellum oblong-lanceolate or lanceolate, more than 1 cm. long, always overtopping the column (when straightened); galea usually more than 1.5 cm. long; lateral sepals always very shortly acuminate and not or scarcely overtopping the galea.*

3. *Flowers distinctly bent forward and 'nodding'; labellum lanceolate, acute, shortly white-hispid, the midrib prominent, strongly decurved and protruding through the sinus between the lateral sepals, never twisted at the apex; galea pale green and white, 1.5-2 cm. long. Open well-watered rocky areas in sclerophyll forest; not uncommon at low and intermediate altitudes; Black Mountain, between Blundell's Flat and Five Crossings, Condor Creek, Lee's Springs, Mt Tennent, Tidbinbilla area; also Queensland to Tasmania, South Australia, and New Zealand. 'Nodding Greenhood', 'Parrot's Beak Orchid'. Fig. 118A.*

6. *P. nutans* R.Br.

3a. *Flower upright or sometimes the stalk bending slightly backwards; labellum 11-14 mm. long, oblong-lanceolate, sub-obtuse, shortly white-hispid, the midrib prominent, the lamina with a definite twist towards the apex, not or only shortly protruding through the sinus between the lateral sepals; galea pale green and white, 2-2.5 cm. long; leaf sheaths inflated. Wet mossy areas on steep shaded slopes, or in leaf litter among grasses in sclerophyll forest; fairly common at intermediate altitudes, occasional at low altitudes; Molonglo Gorge, Five Crossings, Condor Creek below Blundell's Flat, Lee's Springs, Lee's Creek, Mt Tennent; also south-eastern Queensland to Tasmania, South Australia, and New Caledonia. 'Blunt Greenhood'. Fig. 118D-D₁.*

7. *P. curta* R.Br.

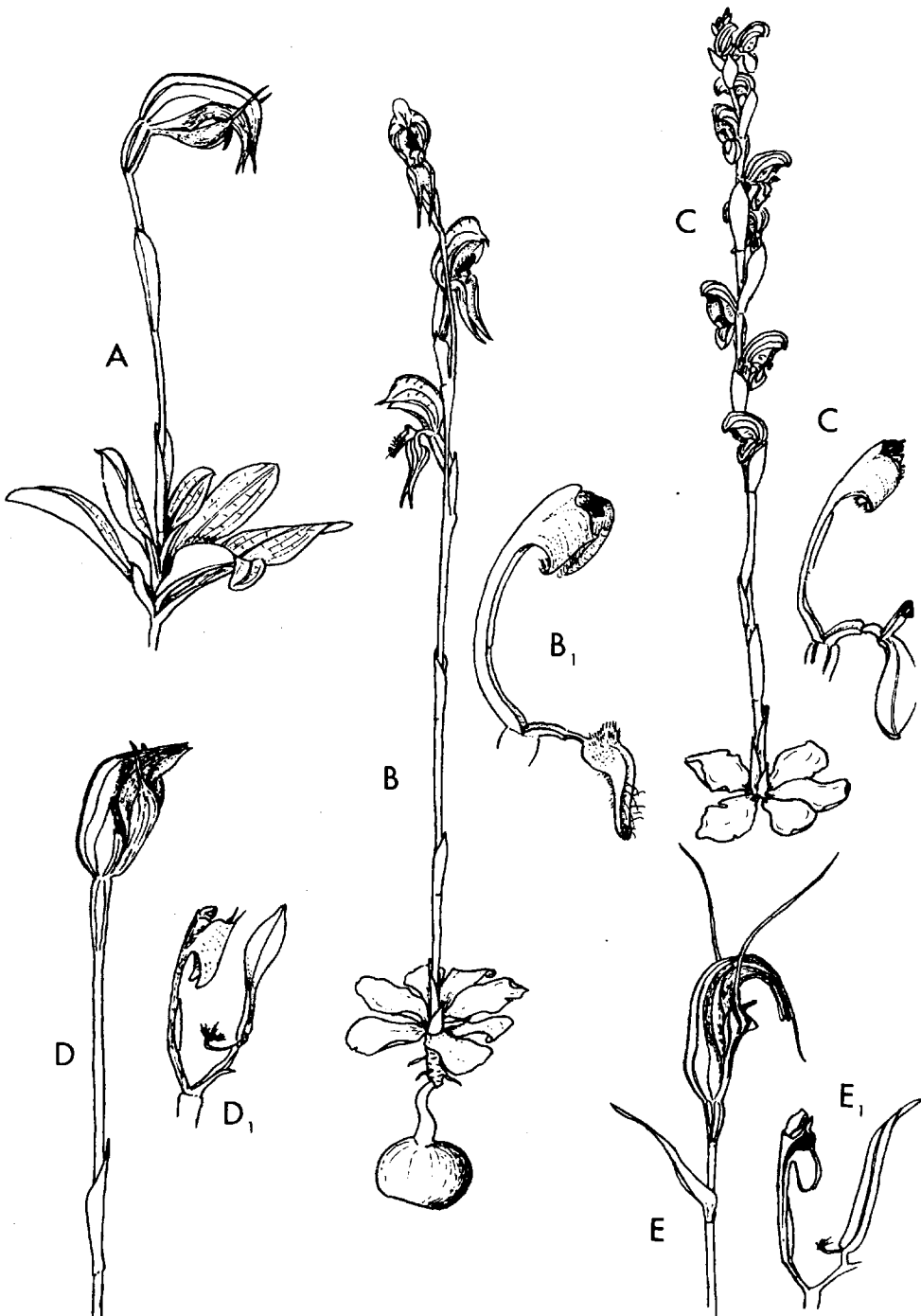
1a. *Radical leaves either completely absent from flowering stems or, if present, not or only sometimes forming a basal rosette and then the lower cauline leaves are large with well-developed laminae.*

4. *Radical leaves present or absent on flowering stems; lower cauline leaves well-developed, with broad-lanceolate laminae often more than 5 cm. long; upper cauline leaves progressively reduced in size, usually to large inflated sheathing bracts.*

5. *Lateral sepals above the sinus abruptly bent backwards across the galea, their short points not or only shortly overtopping it; galea green and white, about 3-3.5 cm. long, the upright portion longer than the distal sub-horizontal portion which has a short blunt appearance due to the broad flaring petals; labellum narrow-lanceolate, about 1.5-1.8 cm. long, decurved towards the apex which shortly protrudes through the wide sinus; in A.C.T. specimens this species is often robust, 15-30 (-45) cm. high, and the distal portion of the labellum is often shiny dark blue. Usually in colonies (often dense) in shaded areas on the margins of streams and sphagnum swamps; at high altitudes, only locally common in very restricted areas; vicinity of Mt Ginini, Snowy Flats (Mt Gingera), upper waters of Jack's Creek, Murray's Gap; also New South Wales (Blue Mountains and Kosciusko region), Victoria, and Tasmania. 'Alpine Greenhood'. Fig. 113A-A₂.*

8. *P. alpina* R. S. Rogers

5a. *Lateral sepals above the sinus more or less erect, at least at the base, long-acuminate and much overtopping the galea; galea often more than 4 cm. long, the basal more or less upright portion shorter than the long narrow and tapering sickle-shaped horizontal portion; labellum narrow-lanceolate, 2-2.5 cm. long, decurved and much protruding through the sinus between the lateral sepals; plants usually 15-30 cm. high. In damp ground, usually along the banks of streams and rivers, intermediate to high altitudes; not common; Coree Flat, vicinity of*



118. A. *Pterostylis nutans*
 B. *Pterostylis rufa* subsp.
 C. *Pterostylis cynocephala*
 D. *Pterostylis curta*
 E. *Pterostylis decurva*

Mt Coree, below Bendora Dam, Cotter Valley, Fishing Gap, Mt Tidbinbilla, Yaouk Gap area; also Tablelands of New South Wales, Victoria and Tasmania. 'Sickle Greenhood'.

9. *P. falcata* R. S. Rogers

4a. *Radical leaves always absent from flowering stems; at least the lowermost cauline leaves reduced to sheathing scales, sometimes increasing in size up the stem to produce short green laminae which are usually less than 5 cm. long* (in A.C.T. specimens).

6. *Lateral sepals above the wide sinus very short, about 2.5-3 mm. long not or only shortly overtopping the galea; galea about 1 cm. long; flowers normally several, racemose, facing towards the stem, green and white suffused with reddish-brown towards the apex; labellum enclosed, oblong or narrow-elliptic, 3-3.5 mm. long. Low and intermediate altitudes, sclerophyll forest; sometimes locally common; Black Mountain, Tidbinbilla area; also Queensland to Tasmania, and South Australia. 'Tiny Greenhood'.*

10. *P. parviflora* R.Br.

6a. *Lateral sepals above the sinus and the galea each more than 1 cm. long (usually much more); flowers normally single on the stem.*

7. *Petals very broad, blunt and inflated or flaring distally; stem very short, less than 7 cm. high* (in A.C.T. specimens); flower comparatively large, the galea about 3 cm. long, green and white with conspicuous reddish-brown veins, suffused with red-brown towards the apex; labellum 1.3-1.8 cm. long, decurved towards the apex, lanceolate, subacute, protruding through the narrow sinus between the lateral sepals; acid more or less skeletal soil; rare; Black Mountain; also New South Wales and Victoria. 'Little Dumphy'.

11. *P. truncata* R. D. FitzG.

7a. *Not as above, the stems usually more than 10 cm. high, or if less then the petals narrowed distally and gradually tapering to an acute or acuminate point.*

8. *Labellum 2 cm. or more long, or if slightly shorter then the galea 3 cm. or more long.*

9. *Sinus between the lateral sepals narrow, not gibbous, distinctly though widely V-shaped when dorsi-ventrally flattened; tip of labellum shortly acuminate; petals with shortly acuminate apices; galea usually about 4 cm. long (to 5 cm. or more), green and white with dark green bands; sepals with filiform tips. Dry sclerophyll forest; rare; Black Mountain; also south-eastern Queensland, New South Wales, and Victoria. 'Autumn Greenhood'.*

12. *P. revoluta* R.Br.

9a. *Sinus between the lateral sepals broad and slightly gibbous, almost straight when dorsi-ventrally flattened; labellum (1.8) 2-2.4 cm. long, conspicuously protruding through the sinus, more or less straight and parallel-sided to above the middle, then decurved and narrowing to the sub-acute or minutely emarginate apex; petals usually acute, sometimes with shortly acuminate apices; galea 3-5 cm. long, usually strongly suffused with red, sometimes wholly green and white with dark green bands; sepals with fine acuminate tips; stems usually minutely hoary* (in A.C.T. specimens). Sclerophyll forest; fairly common at intermediate altitudes; Mt Coree, between Piccadilly Circus and Mt Coree, Bendora Dam, Cotter Valley, Fishing Gap, Mt Tidbinbilla. (See Note 1, p. 136).

13. *P. coccinea* R. D. FitzG.

8a. *Labellum less than 1.5 cm. long* (if between 1.5 and 2 cm. and the galea is less than 3 cm., see Note 1).

10. *Apex of labellum more or less gradually constricted to a fine acuminate recurved point; galea 2-2.5 cm. long, more or less evenly curving from near the base to the filiform recurved tip; petals shortly apiculate. Once collected, Tidbinbilla area; also south-eastern Queensland, New South Wales, and Victoria. 'Small Autumn Greenhood'.*

14. *P. reflexa* R.Br.

10a. *Apex of labellum acute or obtuse.*

11. *Labellum elliptic, oblong or narrowly obovate-acute, 6·5-9 (-10) mm. long, not protruding through the sinus between the lateral sepals; free portion of the lateral sepals (measured from sinus to apex) more or less 1·6-2·3 cm. long.*

12. *Labellum elliptic or narrowly obovate-acute, 6·5-9 mm. long, not overtopping the column, more or less straight, not or scarcely reaching the sinus between the lateral sepals, concave and pale-coloured towards the base, the margins and central raised line reddish towards the apex; sinus between the lateral sepals narrow, distinctly though sometimes widely V-shaped when dorsi-ventrally flattened, not gibbous when viewed from the side (in A.C.T. specimens); galea decurved beyond the lateral sepals, about 1·7-2 cm. long, white and green striped, the petal tips usually tinged with red and slightly flaring beyond the lateral sepals (when viewed from above); dorsal sepal ending in a drooping filiform point 5-10 mm. long, the lateral sepals terminating in straight fine points above the galea. Intermediate altitudes among *Poa* in sclerophyll forest, rare; Mt Tidbinbilla area; also Victoria (type locality Woodside near Yarram), New South Wales Blue Mountains (Grose Valley and near Mt York) and Gibraltar Range (north-east of Glen Innes).*

15. *P. fischii* Nicholls

12a. *Labellum more or less oblong, slightly overtopping the column usually just reaching the sinus between the lateral sepals; sinus between the lateral sepals wide, more or less straight or convex with a central notch when dorsi-ventrally flattened, gibbous when viewed from the side; galea slightly decurved beyond the lateral sepals, about 2 cm. long, white and green striped, sometimes slightly suffused with red-brown at the apex; dorsal sepal acute or ending in a short filiform point about 5 mm. long the lateral sepals slightly thickened at the apex. Sclerophyll forest at intermediate altitude; between Piccadilly Circus and Mt Coree, 3 miles south of Bull's Head, Brindabella Range; also south-eastern Queensland, New South Wales, Victoria, and South Australia. 'Blunt-tongue Greenhood'. (See Note 2, p. 136).*

16. *P. obtusa* R.Br.

11a. *Labellum lanceolate or oblong-lanceolate, more than 1 cm. long, conspicuously protruding through the sinus between the lateral sepals; free portion of the lateral sepals usually more than 3 cm. long.*

13. *Lateral sepals soft and slightly fleshy, never straight but twisted and contorted in various directions (often backwards or forwards) above the galea; sinus at the junction of the lateral sepals (viewed from side) angled and obtuse, straight or slightly convex below the junction and therefore not forming a protruding 'lip'; galea 2-2·5 cm. long, more or less sickle-shaped, the dorsal sepal beyond the petals ending in a drooping filiform tip about 1-2 cm. long; flower green and white, usually strongly suffused with red, at least distally; petals rarely flaring in front of the lateral sepals (viewed from above); labellum lanceolate, 1-1·3 cm. long, gradually tapering to the sub-acute decurved reddish apex where the central raised line is slightly thickened. Grassy areas in sclerophyll forest; intermediate altitudes, not common; Mt Majura, Tidbinbilla Range, new Boboyan road, 6 miles north of Shannon's Flat (growing with *P. decurva*); also Tablelands and Western Slopes of New South Wales from Quirindi to the Tinderry Ranges.*

17. *P. laxa* Blackmore

13a. *Lateral sepals fine, more or less straight and widely spreading above the galea; sinus at the junction of the lateral sepals (viewed from the side) forming a protruding 'lip' due to a distinct concavity immediately below the junction; galea 2-2·5 cm. long, strongly decurved beyond the lateral sepals, the dorsal sepal ending in a drooping filiform tip; flowers green and white, the petals usually slightly tinged with red-brown distally; petals distinctly flaring in front of the lateral sepals (viewed from above); labellum about 1·2 cm. long, more or less oblong, obtuse at the apex, decurved above the middle and protruding through the broad*

sinus between the lateral sepals. Open grassy areas in sclerophyll forest, usually in damp ground; fairly common at intermediate altitudes; Brindabella Range, Bimberi Range, Tidbinbilla Range, new Boboyan road, 6 miles north of Shannon's Flat; also New South Wales, Victoria and Tasmania. 'Summer Greenhood'. Fig. 118E-E₁. (See Notes 1 and 2.)

18. *P. decurva* R. S. Rogers

Note 1: Several collections from the A.C.T. suggest that introgression between *P. decurva* and *P. coccinea* is fairly common. The apparent hybrids may be distinguished from *P. decurva* mainly by the longer labellum (usually about 1.5-1.8 cm.) which is not strictly oblong but narrows slightly above the middle and then tapers to a sub-acute apex, thus approaching that of *P. coccinea*. The galea is also somewhat larger and less decurved, and the segregates generally appear to merge into the smaller-flowered forms of *P. coccinea*.

Note 2: The two collections of this species available to me from the A.C.T. were mixed with specimens of *P. decurva* and a few of the plants appeared to be intermediate between the two species. W. H. Nicholls (*Orchids of Australia*, Pt 4, Pl. 85) suggests that, 'in a number of mountain retreats (up to 3,000 ft. alt.), where *P. obtusa* and *P. decurva* intermingle and flower simultaneously, hybrid forms occur'. *P. obtusa* is also quite variable over its entire range.

It will be seen from the above that the circumscription of *P. coccinea*, *P. decurva* and *P. obtusa* is tentative and somewhat arbitrary until further field and population studies are carried out on these species, preferably over the whole of their range.

DICOTYLEDONEAE

1. Flowers with perianth or with calyx and corolla or with stamens and pistil only; petals free (except in Stackhousiaceae); sepals free or united, sometimes appearing tubular owing to presence of a tubular torus.
2. Trees with jointed branchlets, leaves reduced to minute whorled teeth at the nodes; flowers unisexual, seeds winged and developed in small woody cones.

CASUARINACEAE (p. 143)

2a. Not as in 2.

3. Ovary of free or united carpels and superior, i.e. placed above the perianth or above the sepals and petals; sometimes partially enclosed in a shortly tubular torus.
4. Perianth segments, or sepals and petals, not definite in number; stamens usually numerous.
5. Herbs or climbers; seeds dry.

RANUNCULACEAE (p. 171)

5a. Trees or shrubs; fruit fleshy.

6. Leaves alternate, entire; sepals and petals deciduous.

WINTERACEAE (p. 174)

6a. Leaves opposite, serrate; sepals persistent.

MONIMIACEAE (p. 176)

- 4a. Perianth segments, or sepals and petals definite in number and in 4s or 5s (rarely 3s). (In Papaveraceae and Portulacaceae there are 2-3 sepals and 5 petals.)
7. Flowers with a perianth (not sepals and petals); plants never sticky resinous and if stellate hairs are present then the perianth is dry and chaffy or green.
8. Woody plants, trees, shrubs, undershrubs or woody parasites but not climbing.
9. Perianth conspicuous and red, yellow or (less often) white, if very small then the leaves opposite and flowers paniculate.
10. Leaves alternate; plants not parasitic.

PROTEACEAE (p. 144)

10a. Leaves opposite; stem parasites; calyx reduced to a narrow rim. (See note on Viscaceae p. 152.)

LORANTHACEAE (p. 150)

9a. Perianth small, often minute, whitish or pale yellow; leaves reduced to small teeth or absent; ovary sometimes partially enclosed in the tube.

SANTALACEAE (p. 148)

8a. Herbaceous plants or leafless twiners.

11. Leafless twiners which are stem parasites; fruit a dark berry.

LAURACEAE (p. 176)

11a. Leafy plants.

12. Leaves thin, regularly serrate or crenate, 3-7-nerved from base.

URTICACEAE (p. 143)

12a. Leaves not very thin, irregularly toothed, sinuate or entire, pinnately veined.

13. Petioles with conspicuous sheathing bases; seeds plump, trigonous or slightly flattened.

POLYGONACEAE (p. 152)

13a. Petioles without sheathing bases; seeds disc-shaped and flattened.

14. Perianth segments herbaceous, incurved over the fruit or seed, sometimes absent.

CHENOPODIACEAE (p. 154)

14a. Perianth segments erect or spreading above, dry and scarious or chaffy.

AMARANTHACEAE (p. 158)

7a. Flowers with both calyx and corolla or, if one is absent, the sepals or petals not chaffy or dry.

15. Sepals 2 (rarely 3) or joined in a conical cap which splits on one side to release the petals.

16. Leaves and stems fleshy; capsule circumsciss or opening in valves; seeds glossy; leaves entire.

PORTULACACEAE (p. 160)

16a. Leaves not fleshy, commonly lobed or compound.

17. Capsule opening by apical pores or valves; corolla regular.

PAPAVERACEAE (p. 176)

17a. Fruit 1-seeded, indehiscent; corolla irregular, pouched at base.

FUMARIACEAE (p. 178)

15a. Sepals more than 2 or absent.

18. Flowers bisexual or if unisexual then the male flowers with the stamens united in a column and the female flowers with 5 or more carpels.

19. Flowers regular, i.e. sepals and petals similar in size and shape within each whorl.

20. Stamens numerous.

21. Seeds in a pod; flowers small, numerous in globular heads or cylindrical spikes; leaves pinnate or formed of the broadened petioles (phyllodes).

LEGUMINOSAE-

MIMOSACEAE (p. 196)

21a. Differing from 21 in several characters.

22. Sepals free, overlapping in bud.

23. Leaves alternate; petals notched at summit, the margins undulate; carpels globular, the stamens often clustered.

DILLENIACEAE (p. 256)

23a. Leaves opposite; petals without notched summits, the margins flat;

carpels not globular, the stamens symmetrically arranged and not in clusters.

GUTTIFERAE (p. 257)

22a. Calyx tubular at the base.

24. Petals well-developed, coloured, sometimes shortly joined at base; fruit dividing into 1-seeded fruitlets or forming a many-seeded capsule; flowers sometimes unisexual in which case the petals are small in female flowers.

MALVACEAE (p. 254)

24a. Petals minute or absent; carpels 5. (In A.C.T. plants the carpels open on one side in a boat-shaped follicle.)

STERCULIACEAE (p. 256)

20a. Stamens not more than twice as many as sepals (or petals if both are present).

25. Stamens twice as many as sepals (or petals) or equal in number (except in Cruciferae). If equal in number then the stamens opposite the sepals.

26. Sepals and petals 4, stamens 2-6; fruit 2-celled with lateral valves becoming detached from the base up from a central partition or indehiscent.

CRUCIFERAE (p. 178)

26a. Not as in 26.

27. Leaves not aromatic when crushed, without glands or peltate scales.

28. Anthers on slender or slightly flattened filaments at least as long and never dark purple.

29. Leaves opposite or whorled.

30. Leaves fleshy or succulent, without stipules; carpels equal in number to the sepals and almost free above.

CRASSULACEAE (p. 190)

30a. Leaves herbaceous or stiff, not fleshy but with stipules or joined across the node by a stipular membrane; seeds in capsules, hardened 1-seeded achenes or separating into woody indehiscent carpels.

31. Leaves simple.

32. Water plants with minute sessile axillary flowers, petals pink, seeds straight.

ELATINACEAE (p. 257)

32a. Land plants, flowers not sessile if axillary, seeds globular or reniform.

CARYOPHYLLACEAE (p. 161)

31a. Leaves pinnate, the members of each pair often unequal in size.

ZYGOPHYLLACEAE (p. 238)

29a. Leaves in basal tufts or alternate.

33. Leaves simple, never palmate or deeply lobed.

34. Fruit a capsule, berry, or indehiscent.

35. Flowers in cylindrical spikes; corolla tubular; fruit of 3 nutlets.

STACKHOUSIACEAE (p. 248)

35a. Flowers in racemes, panicles or few in the axils; petals free or almost so; fruit a capsule or berry.

36. Herbs.

37. Leaves with moist glandular hairs; flowers few in racemes, petals white or pink.

DROSERACEAE (p. 190)

37a. Leaves narrow and glabrous; flowers in panicles, petals blue.

LINACEAE (p. 237)

36a. Shrubs or woody climbers; flowers white, yellow, violet, or greenish.

PITTOSPORACEAE (p. 191)

- 34a. Fruit winged, papery and breaking apart to release seeds; shrubs.
SAPINDACEAE (p. 248)
- 33a. Leaves palmate, palmatisect, pinnatisect or deeply lobed.
38. Fruit separating into 5 fruitlets awned by their styles which split away from a central column; petals white, pink or mauve.
GERANIACEAE (p. 232)
- 38a. Fruit a capsule; petals yellow (pink in garden escapes).
OXALIDACEAE (p. 237)
- 28a. Anthers on very short filaments, dark purple and usually closely grouped around the style, flowers nodding.
TREMANDRACEAE (p. 242)
- 27a. Leaves aromatic when crushed, commonly with oil glands on leaves, stems, and calyces, sometimes with peltate silvery or rusty scales.
RUTACEAE (p. 238)
- 25a. Stamens equal in number to and alternate with the sepals; ovary sometimes sunken in the tubular torus but the capsule free in fruit; petals sometimes absent or very small.
RHAMNACEAE (p. 250)
- 19a. Flowers irregular, i.e. the petals not all similar in shape and size.
39. Seeds in a pod.
40. Two or three anthers larger than the rest; flowers almost regular, with the upper petal inside the laterals in the bud.
LEGUMINOSAE-
CAESALPINIACEAE (p. 206)
- 40a. Anthers not uneven in size or filaments alternately long and short; flowers of 'pea' type with upper petal outside the laterals in bud and commonly broader.
LEGUMINOSAE-
PAPILIONACEAE (p. 206)
- 39a. Seeds not in a pod; fruit a capsule with apical valves or pores or splitting to release the seed, rarely a berry.
41. Two lateral sepals enlarged and petaloid; capsule 2-celled.
POLYGALACEAE (p. 242)
- 41a. Lateral sepals not petaloid; capsule 3-6-celled or fruit a berry.
42. Stamens 5, petals entire.
VIOLACEAE (p. 258)
- 42a. Stamens numerous, petals lobed; erect herbs with greenish-yellow flowers.
RESEDACEAE (p. 188)
- 18a. Flowers unisexual; fruit 3- or 4-celled.
43. Styles 3, often once branched giving 6 stigmas; ovary 3-celled, 1-2 seeds per cell, the capsule breaking into 6 portions. (In *Euphorbia* the 'flower' is an inflorescence with a cupular bract enclosing a number of male flowers of one stamen each and a single protrudent female flower without perianth.)
EUPHORBIACEAE (p. 245)
- 43a. Styles 2, ovary 4-celled; male flower of a single stamen; aquatic herbs with opposite leaves and minute axillary flowers.
CALLITRICHACEAE (p. 248)
- 3a. Ovary inferior or appearing so owing to the presence of a calyx tube or tubular torus partially or wholly enclosing the ovary.
44. Leaves minute or absent; flowers small.
SANTALACEAE (p. 148)

- 44a. Leaves developed.
45. Leaves with stipules and pinnate or pinnatifid; plants sometimes thorny.
ROSACEAE (p. 192)
- 45a. Leaves without stipules, simple except in aquatic herbs.
46. Stamens attached within a tubular calyx or to a tubular torus around a sunken ovary or attached to the lobes of a petaloid perianth.
47. Shrubs, undershrubs, or herbs.
48. Stamens 2, attached to the tubular 'calyx'; sepals 4, petals none; fruit a dry indehiscent nut; flowers in terminal clusters, commonly with 2 or more leafy bracts enclosing them.
THYMELAEACEAE (p. 260)
- 48a. Stamens more than 2; fruit a capsule.
49. Herbs; flowers solitary in the leaf axils or forming leafy spikes, petals pale to deep pink.
LYTHRACEAE (p. 262)
- 49a. Shrubs or undershrubs; stamens alternate with the sepals; petals absent or small, sometimes hooded over the stamens at mouth of tubular torus, white or yellow.
RHAMNACEAE (p. 250)
- 47a. Stem or root parasites; calyx represented by a very narrow rim on top of ovary or lacking; flowers red or yellow.
LORANTHACEAE (p. 150)
- 46a. Stamens not attached within a calyx tube or tubular torus or to perianth segments; ovary definitely inferior.
50. Ovary of 1 to 10 cells, never of 2 flattened or bristly carpels.
51. Herbs, not aromatic when crushed; flowers never in umbels.
52. Petals not hooded or concave over the anthers; fruit dehiscing from the top by loosely spreading valves.
ONAGRACEAE (p. 275)
- 52a. Petals hooded and concave over the anthers with which they fall before the stigmas mature; land plants with hard indehiscent fruits or aquatic herbs with opposite or whorled leaves and fruits of four nutlets.
HALORAGACEAE (p. 279)
- 51a. Woody plants, leaves aromatic when crushed; flowers rarely in umbels (except in *Eucalyptus*).
MYRTACEAE (p. 262)
- 50a. Ovary of 2 carpels each with a distinct style which is often swollen at the base; flowers in umbels or rarely in heads.
53. Herbs or small wiry shrubs; fruit separating into 2 dry 1-seeded nutlets with conspicuous ridges or rows of bristles.
UMBELLIFERAE (p. 280)
- 53a. Shrubs; fruits smooth and commonly slightly fleshy or with shallow furrows.
ARALIACEAE (p. 290)
- 1a. Flowers with both calyx and corolla; sepals commonly and petals always joined and more or less tubular at least at the base; sepals rarely absent but if so the flowers irregular and the ovary inferior or the flowers in dense heads and with inferior ovaries; stamens attached to corolla tube.
54. Ovary superior or (in Primulaceae) half inferior.
55. Flowers regular, stamens equal in number to corolla lobes.
56. Undershrubs or shrubs with small rigid entire leaves which are often pungent-pointed and show parallel or spreading nerves on the undersurface; sepals free,

often stiff or hardened; fruit a berry or capsule with minute seeds (Heaths).

EPACRIDACEAE (p. 290)

56a. Herbs or shrubs, leaves not rigid or pungent pointed (except in *Navarettia* in which the leaves are deeply lobed and pinnatisect); calyx deeply lobed or tubular.

57. Seeds in capsules, numerous, minute (to less than 1 mm. diameter); herbs, leaves opposite or alternate.

58. Land plants; flowers in axils of opposite leaves or in terminal inflorescence above alternate leaves; petals entire.

59. Corolla orange, deep blue or pale pinkish, not persistent; stamens opposite the petals; ovary half inferior in *Samolus*.

PRIMULACEAE (p. 300)

59a. Corolla persisting around developing capsule, deep pink, yellow or white with purple veins; stamens opposite sepals.

GENTIANACEAE (p. 301)

58a. Aquatic plants (sometimes exposed on drying mud), the leaves in radical tufts or alternate, the blades often floating; flowers pedicellate in clusters from nodes of leafless stems or from base, petals yellow, deeply fringed.

MENYANTHACEAE (p. 302)

57a. Herbs or shrubs, leaves alternate or radical; fruit a berry or if dry the seeds not numerous or not less than 1 mm. diameter.

60. Leaves not all radical; flowers not in pedunculate spikes.

61. Plants trailing, twining, prostrate or stoloniferous; flowers axillary; ovary with 1-2 seeds in each of the 2 cells.

CONVOLVULACEAE (p. 304)

61a. Plants erect or ascendent, if prostrate then the fruit a berry.

62. Herbs clothed with spreading or appressed hairs which may be stiff bristles, or have hooked apices or apical glands.

63. Fruit breaking into 4 1-seeded nutlets; flowers in spikes or racemes which are coiled at their apices. (Corolla slightly irregular in *Echium*.)

BORAGINACEAE (p. 306)

63a. Fruit a 3-celled capsule; flowers sessile in heads; leaves pinnatisect with pungent-pointed lobes, hairs glandular (in A.C.T. species).

POLEMONIACEAE (p. 304)

62a. Plants glabrous or almost so or clothed with stellate hairs; fruit a berry or spiny capsule.

SOLANACEAE (p. 319)

60a. Leaves all radical, nerves longitudinal; flowers in pedunculate oblong or linear spikes.

PLANTAGINACEAE (p. 333)

55a. Flowers irregular; stamens fewer than the corolla lobes, rarely equal in number.

64. Ovary 1-2-celled, not divided into 4 nutlets; leaves radical, opposite or alternate, rarely absent.

65. Swamp plants with or without small cluster of radical leaves, lower leaves modified into filaments bearing minute white bladders; sepals 2, corolla with a broad lower lip which is spurred at base.

LENTIBULARIACEAE (p. 333)

65a. Land plants (except *Limosella* in Scrophulariaceae), erect, prostrate or trailing.

66. Leafless root parasites; corolla lobes undulate-crisped; seeds very numerous and minute; plants pinkish-brown in hue.

OROBANCHACEAE (p. 332)

66a. Leafy plants.

67. Capsule never much longer than calyx.

68. Style simple or forked above, not developing an indusium; seeds minute and numerous.

SCROPHULARIACEAE (p. 322)

68a. Style terminating in a flattened cupular indusium; seeds flattened, not numerous and minute, the margins sometimes winged.

GOODENIACEAE (p. 347)

67a. Capsule long and developing long curved horns; trailing herbs.

MARTYNIACEAE (p. 332)

64a. Ovary 2-celled but forming 4 nutlets in fruit; leaves opposite, rarely whorled; stems often quadrangular.

69. Style attached to top of ovary; flowers in spikes.

VERBENACEAE (p. 310)

69a. Style attached low between the 4 nutlets; flowers clustered or few in the leaf axils or forming terminal inflorescences or panicles, or if spicate then with conspicuous bracts.

LABIATAE (p. 310)

54a. Ovary inferior.

70. Flowers regular; anthers free from one another.

71. Leaves simple.

72. Flowers small, sometimes unisexual, shortly stalked or sessile, often clustered; leaves opposite with connecting stipular membrane or with leafy stipules resembling leaves which therefore appear whorled.

RUBIACEAE (p. 334)

72a. Flowers blue, pedicellate, rarely less than 5 mm. diameter; leaves without stipules or stipular membranes, opposite or alternate.

CAMPANULACEAE (p. 342)

71a. Leaves compound; flowers white in terminal panicles or umbels; fruit fleshy.

CAPRIFOLIACEAE (p. 340)

70a. Flowers irregular or if regular the anthers connivent around the style (except *Wahlenbergia* in Campanulaceae).

73. Flowers unisexual, solitary or in loose cymes; leaves alternate; herbs with tendrils.

CUCURBITACEAE (p. 340)

73a. Flowers bisexual or if unisexual then both sexes present in heads.

74. Sepals present or if absent then the flowers not clustered in heads.

75. Style and stamens not joined in a reflexed column with a sensitive base.

76. Style without a terminal indusium from which the stigmas emerge; anthers free or connivent around style; flowers regular or irregular, commonly blue or bluish-white.

CAMPANULACEAE (p. 342)

76a. Style with terminal flattened indusium from which the stigmas emerge after the anthers wither; corolla irregular and deeply lobed (yellow in A.C.T. species).

GOODENIACEAE (p. 347)

75a. Style and stamens united in a reflexed or curved column with a sensitive base; corolla pink or white in A.C.T. plants.

STYLIDIACEAE (p. 348)

74a. Sepals absent or represented by a ring of hairs, bristles, spines or scales (pappus) on top of the seed; flowers sessile in heads surrounded by an involucre of bracts; sometimes the heads compound, i.e. each head composed of many small heads each within its (commonly membranous) involucre bracts.

COMPOSITAE (p. 350)

CASUARINACEAE

CASUARINA Adans.

1. Branchlets with 6-9 teeth per whorl.
2. Medium sized to tall trees on banks of creeks and rivers; branchlets about 0.5 mm. diameter; *fruiting cones about 10 mm. long and less in diameter, seeds pale brown*. $2n = 18$ (Barlow, 1959). Common along banks of Murrumbidgee, Cotter, Paddy's and other rivers; also in Queensland, New South Wales and south-eastern New Guinea. 'River Oak'. Fig. 119B (cone).

1. *C. cunninghamiana* Miq.

2a. Small tree of bushy habit, branchlets 0.5-0.75 mm. diameter; fruiting cones grey-brown, *to 3 cm. long, 1.5-2 cm. diameter, seeds dark brown*. Steep rocky slopes near Gibraltar Falls; more common in coastal and tableland areas of eastern and southern Australia, and in Tasmania. 'Black She-oak'. Fig. 119D (cone).

2. *C. littoralis* Salisb.

1a. Branchlets with 10-16 teeth per whorl, about 1 mm. diameter; fruiting cones more than 1.5 cm. diameter.

3. Shrubs or small trees to 5 metres, usually dioecious; branchlets commonly drooping; *fruiting cones 3-5 cm. long, seeds dark brown*. $2n = 26$ (Barlow, 1959). Dry stony ridges and low hills to 2500 ft elevation, e.g. Red Hill, Tuggeranong area, Tharwa; widespread in temperate Australia and Tasmania. 'Drooping She-oak'. Fig. 119A (branch and 'details').

3. *C. stricta* Dryander

3a. Small trees of sparse habit, sometimes producing root suckers; fruiting cones short and broad, *to 1 cm. long but 1.5-2 cm. diameter and of two rows of seed follicles*. Black Mountain Peninsula and banks of Molonglo River below the Gorge; also west of the Dividing Range from southern Queensland to Victoria and South Australia. 'Bull Oak'. Fig. 119C (cone).

4. *C. luehmannii* R. T. Baker

URTICACEAE

1. Plants with stinging hairs; leaves opposite; flowers in clustered axillary spikes or panicles.

1. *Urtica*

1a. Plants without stinging hairs; leaves alternate; flowers in axillary clusters.

2. *Australina*

1. URTICA L.

1. *Perennial*, erect or ascendent herb, stems and leaves with stinging hairs; leaves on slender petioles, *lanceolate*, 3-8 cm. long, margins serrate, apices acuminate; flowers loosely clustered in slightly branched panicles, monoecious; male perianth 4-lobed, lobes concave; inner larger and later concave around nut in female flowers. Common in shaded damp sites in forest gullies; also New South Wales, Victoria, South Australia, and Tasmania. 'Scrub Nettle'.

1. *U. incisa* Poir.

1a. *Annual*, erect or ascendent herb, stems and leaves with stinging hairs; *leaves ovate*, 2-7 cm. long, margins serrate; male and female flowers in same inflorescence, large lobes of female perianth ciliate and with dorsal stinging hair. Cosmopolitan weed, native to Europe, widely naturalised in Australia and Tasmania, common in gardens and near settlements; also shaded sites in heavily grazed pastures. 'Dwarf Nettle'.

2. **U. urens* L.

2. AUSTRALINA Gaudich.

Perennial herb, prostrate or ascendent, stems commonly reddish; lower leaves orbicular, upper ovate-lanceolate, crenate-toothed, 2.5-4 cm. long; monoecious flowers in axillary clusters (sometimes mixed); male clusters pedunculate, perianth irregular, bilabiate, stamen 1; female clusters sessile, perianth obscurely 5-toothed, enlarging to 2 mm. in fruit and enclosing the nut. Wet shady places in mountain gullies; New South Wales, eastern Victoria, and Tasmania. 'Smooth Nettle'. Fig. 120.

A. *muelleri* Wedd.

PROTEACEAE

1. Fruit a firm indehiscent berry; flowers yellow or creamy, usually solitary in leaf axils.

1. *Persoonia*

1a. Fruit dehiscent, the seed flat and usually winged.

2. Flowers in loose racemes or if in spikes then these less than 3 cm. in diameter.

3. Seed follicles thick and woody; flowers in short racemes or umbels which are usually axillary.

2. *Hakea*

3a. Seed follicles hardened but not thick and woody.

4. Flowers pedicellate in loose racemes or umbels or if the racemes are dense then the leaves subdivided with pungent-pointed lobes.

5. Racemes or umbels usually terminal; seeds 2 per follicle; flowers white or red.

3. *Grevillea*

5a. Racemes terminal or axillary; seeds more than 2 per follicle; flowers creamy white.

4. *Lomatia*

4a. Flowers white or creamy, sessile in spikes terminal to densely leafy short shoots; seeds 2 per follicle.

5. *Orites*

2a. Flowers numerous in thick woody spikes more than 3 cm. in diameter and terminal; follicles partially embedded; small trees or large shrubs.

6. *Banksia*

1. *PERSOONIA* J. E. Sm.

1. *Prostrate or low undershrub, leaves linear, acute, 1.5-3 cm. long, glabrous except when young; perianth golden-yellow, glabrous, segments with slender points which are free in bud; ovary glabrous; berry hard and dry, reddish to purple, ellipsoidal, 1-1.5 cm. long. Common throughout forest and woodland areas 2000 to 4500 ft, e.g. Tidbinbilla, Brindabella Ranges etc.; New South Wales and Victoria. 'Yellow Geebung'. Fig. 121.*

1. *P. chamaepeuce* Lhotsky ex Meisn.

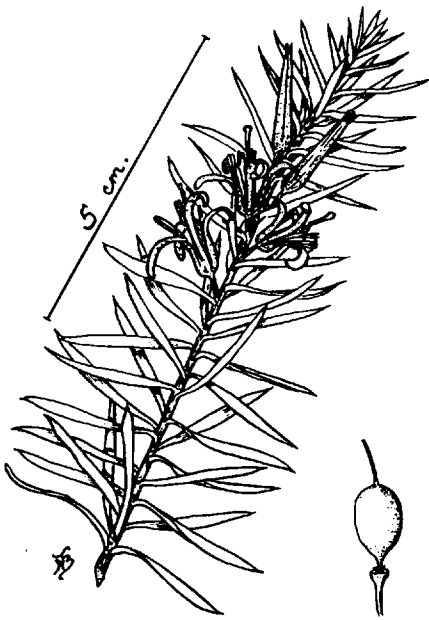
1a. Erect shrubs or small trees; perianth villous or silky hairy; leaves obovate to oblanceolate.

2. Low bushes less than 1 metre high, leaves apiculate, 2.3-5 cm. long, margins flat or recurved; stems and leaves *loosely villous* (at least when young); flowers generally solitary, perianth *segments very shortly apiculate*, hirsute-villous. Dry sclerophyll forests; New South Wales and Victoria. 'Rigid Geebung'. Fig. 122.

2. *P. rigida* R.Br.

2a. Shrubs 2-3 metres high, *villous with short velvety tomentum*; leaves obtuse, not apiculate, margins recurved or revolute, 3-5 cm. long; flowers often several in each axil, *segments long apiculate* (to 1.5 mm.), softly but densely villous. Forests of upper slopes in the ranges; also New South Wales (Kosciusko region) and eastern Victoria.

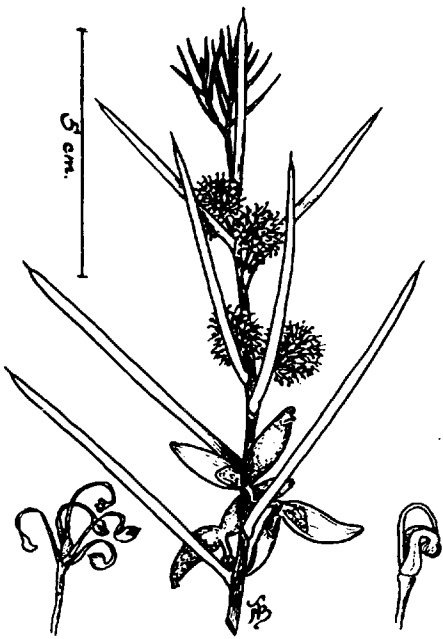
3. *P. subvelutina* L. Johnson



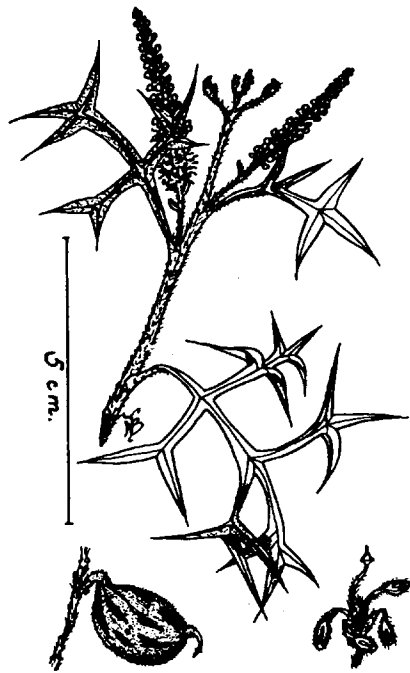
121. *Persoonia chamaepeuce*



122. *Persoonia rigida*



123. *Hakea microcarpa*



124. *Grevillea ramosissima*

2. HAKEA Schrad.

1. Shrub to 2 metres high, branches soon glabrescent and darkening with age; leaves terete, rarely linear-elliptical, glabrous, 3-6 cm. long, pungent-pointed; rhachis of racemes short, hairy; *slender pedicels and perianth glabrous*, segments 4-5 mm. long, revolute; ovary and style glabrous; *follicle slender*, dark-coloured, *less than 2 cm. long*, usually with a short dorsal horn near apex, seed smooth on valve side. Common on stony slopes from below 2000 ft to upper levels in mountains; also south-eastern Queensland, New South Wales, Victoria, and Tasmania. Fig. 123.

1. *H. microcarpa* R.Br.

1a. Shrub to 2 metres high, branches sparsely sericeous when young; leaves terete, glabrescent, 2.5-6 cm. long, pungent-pointed; *short rhachis and slender pedicels sericeous*, perianth segments glabrous, revolute; ovary and style glabrous; *follicles thick, woody*, 2-3 cm. long, the thickened base at first almost smooth but later thickened and tuberculate, seed rough on valve side. Black Mountain and other dry forest habitats at low elevations; Australian distribution depends on the specific limits used (New South Wales, Victoria, Flinders and Cape Barren Is.) but a species complex is involved in which the A.C.T. form may be distinct.

2. *H. sericea* Schrad.

1b. Shrub; young shoots, rhachis and pedicels sericeous as in *H. sericea* but leaves thicker and 6-10 cm. long; follicle 2.5-3 cm. long, thick and woody, the surface tuberculate but without a thinner non-swollen portion above; seeds rough against the valve. Reported from the southern parts of the A.C.T.; also New South Wales to Tasmania.

3. *H. lissosperma* R.Br.

3. GREVILLEA R.Br.

1. Dense shrub to 1.5 metres high, branches tomentose at least when young, *leaves twice ternately divided* into narrow lobes with pungent apices, subglabrous above, pale tomentose below, veins conspicuous, margins recurved from lateral veins; *racemes slender*, terminal or in upper axils, rhachis tomentose; perianth about 3 mm. long, pale and sericeous outside, glabrous within; ovary and base of style hairy, *stigmatic cone erect and glabrous*; follicle 1.1-1.5 cm. long, appressed-pubescent. Mt Jerrabomberra near Queanbeyan, New South Wales, and Victoria. Fig. 124.

1. *G. ramosissima* Meisn.

1a. Leaves undivided; style with oblique disk bearing the stigmatic cone.

2. Leaves with rigid or pungent points, narrow with recurved or revolute margins; ovary and follicle glabrous.

3. Small shrubs to 1 metre high but commonly smaller; young shoots appressed-sericeous; *leaves oblong*, to 1 cm. long, revolute margins obscuring sericeous hairs of lower surface, *apices rigid or pungent*; racemes umbellate, terminal or on very short laterals, pedicels very slender; *perianth 3-4 mm. long, pale creamy or white*; follicle 8-10 mm. long. In damp ground or near swamps at high elevations, often common in such habitats; on high ground in Australian and Victorian Alps, also Tasmania.

2. *G. australis* R.Br.

3a. Shrub 1.2-1.5 metres high, branches at first hoary-tomentose, *leaves commonly clustered on short laterals, narrow-linear, pungent, glabrous*, angular above (when dry), revolute margins covering midrib below, 1.1-1.75 cm. long; racemes terminal to short lateral branches, rhachis short, appressed pubescent; *perianth pale to bright red* (rarely creamy), buds with oblique globular apices, segments appressed pubescent outside, densely villous below middle within, to 12 mm. long; ovary pedicellate above a curved gland, style glabrous or with few hairs

above; follicle slender fusiform, subglaucous when young, dark later. Common along banks of main creeks and rivers; New South Wales.

3. *G. juniperina* R.Br.

2a. Leaves not rigidly or pungently pointed, from narrow oblong to broadly ovate.

4. Ovary and follicle villous or pubescent; buds swollen below and revolute above.

5. Small shrubs, branches shortly tomentose (grey or ferruginous); leaves 1-3 cm. long, narrow oblong, obtuse or apiculate, upper surface sparsely villous becoming scabridulous, lower villous but obscured by recurved or revolute margins; racemes terminal, rhachis short and glabrous; *perianth dark red or pale above, segments glabrous* but with dense reflexed hairs at the middle inside (lower segments); villous ovary sessile above short gland, *style 2 cm. long, robust, villous*; follicles sparsely hirsute. Not uncommon in forested areas, especially on shallow soils; also New South Wales and eastern Victoria. Fig. 125.

4. *G. lanigera* A. Cunn. ex R.Br.

Note: In var. *ericifolia* (R.Br.) Ewart and Rees the mucronate leaves are narrow and closely revolute. Tidbinbilla.

5a. Low shrubs, branches and leaves woolly villous; leaves oblong to linear, 1-1.75 cm. long, obtuse or apiculate; racemes terminal, rhachis short and villous as are the few pedicels; *perianth bright red* (when fresh), the swollen base almost glabrous but with sparse hairs along nerves, *villous above, the 2 longer segments with hairy conical appendages near apices*, the 2 shorter with a dense tuft of reflexed hairs across the middle inside; ovary sessile above obliquely divaricate gland, *style not conspicuously longer than perianth, glabrous on one side*. Common on shallow stony soils on hills at lower elevations; Black Mountain, Mt Ainslie, etc.

5. *G. aff. alpina* Lindl.

4a. Ovary and follicle glabrous; perianth densely covered with rusty-red appressed hairs.

6. Spreading (often diffuse?) shrub to 2 metres high, thinly tomentose at least when young; *leaves petiolate, broadly ovate*, obtuse to acute-acuminate, apiculate, 2-7 cm. long, 2-4 cm. wide, sparsely pubescent above when young, pinnately veined, margins recurved, lower surface with persistent short tomentum; racemes terminal, sometimes branched, pedicels short and with appressed rusty-red tomentum; *buds almost straight with sharply deflected angular apex*; perianth segments to 1.5 cm. long, acuminate and *with short vertical line of white hairs in the median line below middle within*; ovary stipitate above short gland, style glabrous and dark coloured like ovary; follicle fusiform, 1.5 cm. long. Forested slopes and gullies above 3000 ft; mountain habitats of south-eastern New South Wales and eastern Victoria.

6. *G. victoriae* F. Muell. sens. lat.

6a. Low or bushy shrub to 1 metre high, stems with grey or rusty-red tomentum; *leaves elliptical to oblanceolate, 1-2 cm. long*, glabrescent above, appressed-sericeous below, margins flat or slightly recurved, obtuse apiculate; racemes terminal to short lateral shoots, often branched at base; *buds almost straight with globular apices, perianth segments to 1 cm. long with dense tuft of long hairs inside below middle*; follicles 1-1.5 cm. long. In forests and upper gullies of mountain slopes; Brindabella Range, usually on skeletal soils or rocky screes where it grows with *Podocarpus lawrencei*. The type specimen (Hoogland 6279) was collected near Mt Franklin.

7. *G. diminuta* L. Johnson

4. LOMATIA R.Br.

Tall shrub, leaves linear to narrow lanceolate, acuminate, serrate, 10-20 cm. long, glabrous or glabrescent; racemes from upper axils, loose with the flowers paired, perianth white,

glabrous; follicles thinly woody, 2-2.5 cm. long, style persistent, valves spreading, seeds flat and winged. Margins of rivers and creeks and in mountain gullies; also New South Wales and Victoria (Alps). Fig. 126.

L. myricoides (Gaertn. f.) Domin

5. **ORITES** R.Br.

Low dense shrubs to 1.5 metres high, young stems pubescent but soon glabrescent; leaves shortly petiolate, oblong to lanceolate, obtuse, 2.5-4 cm. long, margins slightly recurved, glabrous, veins prominent below (when dry); flowers creamy, glabrous, sessile, in spikes 1-3 cm. long terminating the upper shoots; perianth segments 5-7 mm. long, spathulate; follicle green, 2 cm. long, oblique, shortly pubescent; seeds 2, terminally winged. In alpine woodland and on high slopes at upper elevations; also south-eastern New South Wales and eastern Victoria. Fig. 127.

O. lancifolia F. Muell.

6. **BANKSIA** L.f.

Small tree or tall shrub, leaves linear-cuneate to oblanceolate, 2.5-5 cm. long, truncate mucronate, margins recurved, glabrous above, appressed pubescent below, midrib and young stems rusty-pubescent; flower cones terminal or appearing lateral due to later shoot development, 3.5-4 cm. diameter (in bud); perianth segments yellow, with appressed sericeous hairs, styles glabrous and rigid; fruiting cones 4-4.5 cm. diameter (excluding persistent styles). In forests of lower slopes and in mountain gullies. Tablelands of New South Wales, Victoria, South Australia, and Tasmania. 'Banksia'. Fig. 128.

B. marginata Cav.

SANTALACEAE

1. Pedicel of female flowers thick, becoming fleshy and often coloured under the fruit.

1. **Exocarpos**

1a. Pedicel of female flowers very short, not becoming fleshy, minute perianth persistent on summit of fruit.

2. Pedicels with minute persistent bracts; flowers bisexual and solitary.

2. **Choretrum**

2a. Pedicels without persistent bracts; flowers unisexual, the females often solitary (1-3 per cluster, rarely more), males in small clusters.

3. **Omphacomeria**

1. **EXOCARPOS** Labill. *See Stauffer (1959)*

1. Shrubs or small trees; minute scale-leaves alternate.

2. Large shrub or small tree, *flowers in short spikes at the end of the striate-ridged but not angular branchlets*, 5-merous, perianth minute; hard fruit ovoid, *thick pedicel red or yellow when fleshy*. Common and of cypress-like habit, in dry sclerophyll forests 2000-4000 ft. The pedicels are edible. Widespread from Queensland to Tasmania and South Australia. 'Cherry Ballart'. Fig. 129.

1. *E. cupressiformis* Labill.

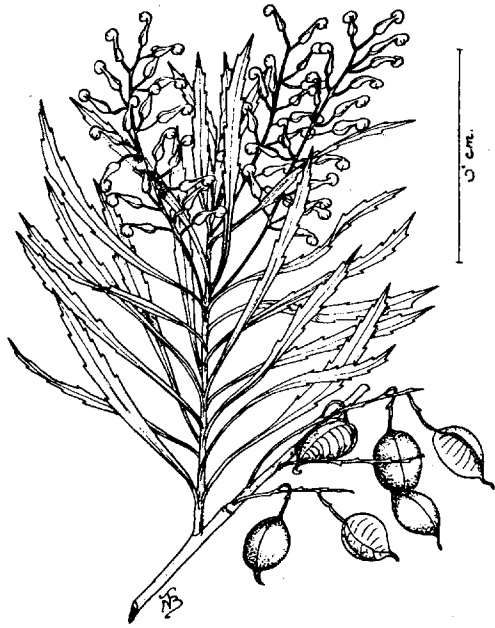
2a. Shrub to 1.5 metres high, *flowers in small clusters along the angular-striate branchlets*, 4- or 5-merous; fruit hard and globular, *pedicel white or pinkish when fleshy* (unpalatable). Growing in communities under forest shade in mountain gullies. South-eastern temperate Australia and Tasmania. 'Pale Ballart'.

2. *E. strictus* R.Br.

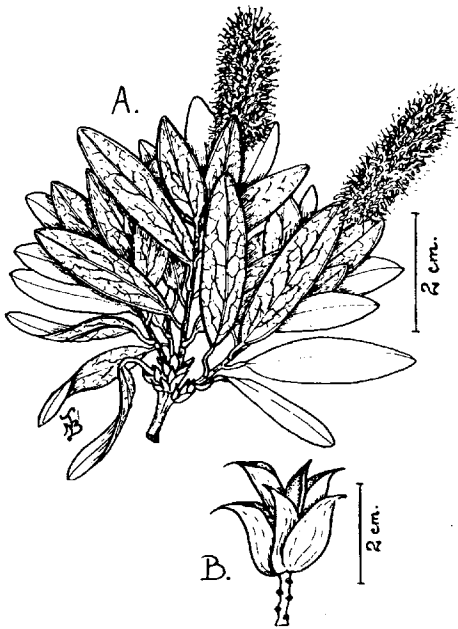
1a. Dwarf prostrate shrub, sometimes only a few centimetres in diameter; minute scale leaves opposite or almost so; *flowers paired or few in axils*, unisexual, 5-merous; the hard fruit 3 mm. long, *pedicel red when fleshy*. Rare in the A.C.T. but found on raised areas in



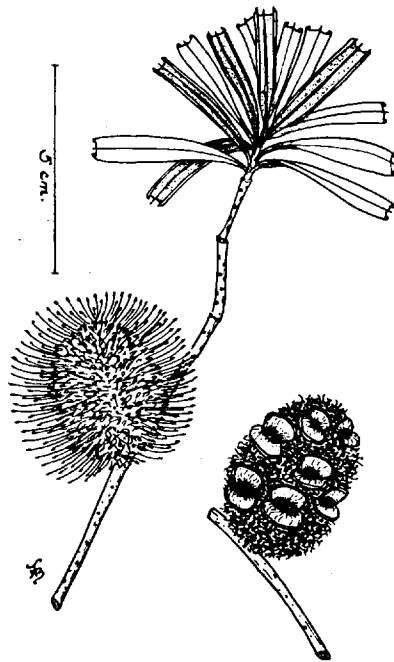
125. *Grevillea lanigera*



126. *Lomatia myricoides*



127. *Orites lancifolia*



128. *Banksia marginata*

swamps at high elevations along the Brindabella Range; also at high elevations in south-eastern New South Wales, Victoria and Tasmania. 'Alpine Ballart'.

3. *E. nanus* J. D. Hook.

2. CHORETRUM R.Br.

Small shrub or undershrub, stems terete; leaves minute narrow scales on young shoots or absent; flowers subtended by minute bracts and on a bracteate pedicel, 5-merous; fruit a dry drupe topped by persistent perianth. In forest shade, 3000-4000 ft; widespread in southern temperate Australia. 'Sour Bush'. Fig. 130.

C. pauciflorum A. DC.

3. OMPHACOMERIA (Endl.) A. DC. See Stauffer (1959)

Dioecious, rhizomatous shrub to 1 metre high, stems often flexuose, striate-terete, often with swellings due to insect galls, more or less resinous when young; flowers unisexual, females solitary or in clusters of 1-3 (rarely more) on bractless pedicels, perianth commonly 4-merous, abortive stamens present; males sessile in minute spikes or clusters, commonly 4-merous, ovary abortive; fruit a dry drupe from which perianth is finally deciduous. Dry sclerophyll forest at low and intermediate elevations; also New South Wales and Victoria. 'Sour Bush'. Fig. 131.

O. acerba (R.Br.) A. DC.

LORANTHACEAE

1. Buds obtuse or club-shaped, anthers adnate to filaments; plants attached to host by a bulbous union without adventitious roots.

1. *Amyema*

1a. Buds acuminate, anthers versatile; plants attached to host with adventitious roots.

2. *Muellerina*

1. *AMYEMA* Tiegh. See Barlow (1966)

1. *Leaves lanceolate*, glabrous or minutely hoary, yellowish-green, 6-15 cm. long, 3-5-nerved; plants forming pendulous clusters of branches; flowers in trifold axillary umbels or corymbs and each subtended by a minute orbicular bract; calyx tubular and truncate, 4-5 mm. long; *corolla red within, hoary without*; petals 2-2.5 cm. long, linear with concave obtuse apices; staminal filaments adnate to petals for most of their length, anthers linear, 3-4 mm. long; fruit an oblong fleshy drupe. 'Mistletoe'.

2. Central flower of each triad pedicellate like the laterals. Commonly parasitic on *Eucalyptus polyanthemos* and *E. melliodora* in the A.C.T. but found throughout most of Australia. Fig. 132C.

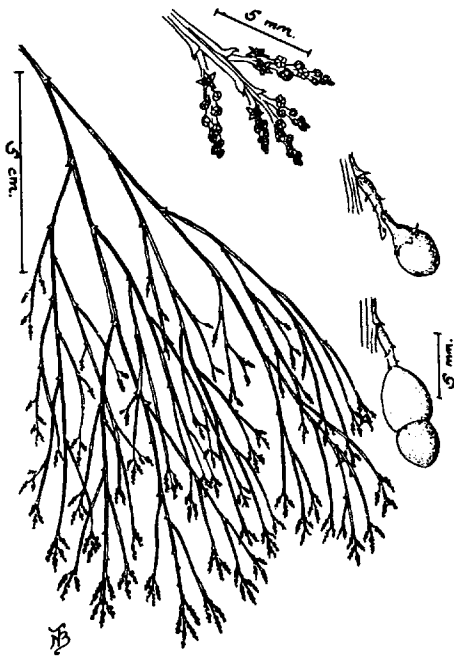
1. *A. miquelii* (Lehm. ex Miq.)
Tiegh.

2a. Central flower of each triad sessile. Commonly parasitic (in the A.C.T.) on *E. dives*, *E. macrorhyncha*, *E. mannifera* subsp. *maculosa*, and *E. rossii*. Common from New England region of New South Wales to south-east of South Australia. Fig. 132A and B.

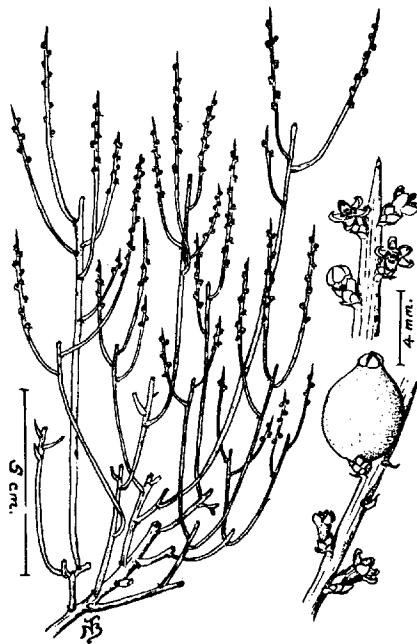
2. *A. pendulum* (Sieb. ex Spreng.)
Tiegh. subsp. *pendulum*

1a. *Leaves terete*, grey-hoary except when old, 10-20 cm. long, 1 mm. in diameter; habit less pendulous than in preceding; flowers in trifold axillary umbels, central flower of each triad sessile, *perianth grey-hoary to mealy tomentose without*, dark red within; drupe pearly-white. Parasitic almost exclusively on *Casuarina* spp. (locally on *C. cunninghamiana*). Eastern Australia from Cairns to the A.C.T.

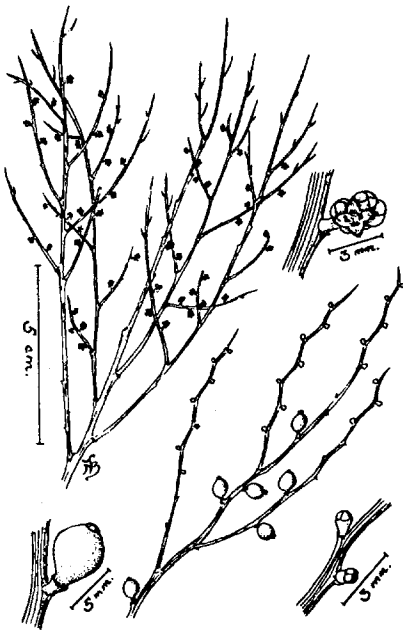
3. *A. cambagei* (Blakely) Danser



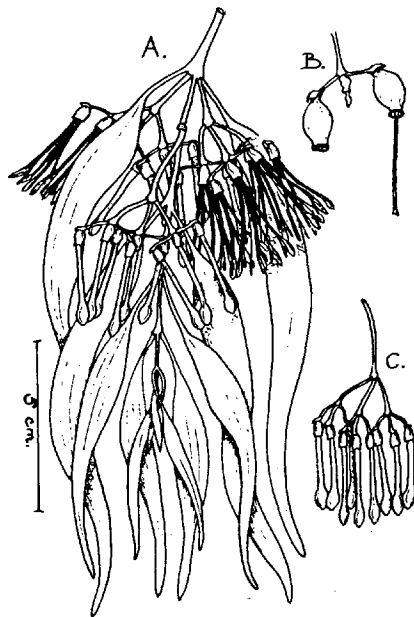
129. *Exocarpos cupressiformis*



130. *Choretrum pauciflorum*



131. *Omphacomeria acerba*



132. A., B. *Amyema pendulum*
C. *Amyema miquelii*

2. **MUELLERINA** Tiegh. See Barlow (1966)

1. *Leaves petiolate, lanceolate to ovate, 6-15 cm. long, obscurely 3-nerved; flower cymes terminal between uppermost pair of leaves, with 2 or 3 flower bearing branches; flowers in pairs of triads with central one sessile; buds 3-5 cm. long; petals narrow-linear, yellow below and red apically; calyx slightly falcate, later pear-shaped or cylindrical. Locally parasitic on Eucalyptus blakelyi, E. polyanthemus, and E. robertsonii but less common than Amyema spp. Distributed from southern Queensland to south-eastern South Australia. Fig. 133.*

1. **M. eucalyptoides** (DC.) Barlow

1a. *Leaves sessile or almost so, linear or narrow oblong, obtuse, 1.5-2.5 cm. long; flower cymes reduced to a pair of pedicellate flowers and terminal to very short lateral branchlets; buds to 2 cm. long. Parasitic on Callitris in Mt McDonald area. South-eastern Queensland to southern New South Wales.*

2. **M. bidwillii** (Benth.) Barlow

VISCACEAE

Recent work discussed by Barlow (1964) has led to the recognition of the Viscaceae as a family distinct from the Loranthaceae. The only representative of the Viscaceae of significance to the flora of the A.C.T. is *Notothixos cornifolia* (A. Cunn.) Oliver. This is parasitic on *Brachychiton* in the Wee Jasper area (in limestone country). The young shoots and the flowers are hoary with minute yellow hairs. It has not yet been recorded for any site within the A.C.T. though its presence locally seems likely. Fig. 134.

POLYGONACEAE

1. Perianth lobes 6, the inner 3 larger than the outer (except *R. acetosella*).

1. **Rumex**

1a. Perianth lobes 5, subequal in length.

2. Flowers mostly bisexual, herbs with erect or prostrate stems.

2. **Polygonum**

2a. Flowers unisexual, woody herb with prostrate matted stems.

3. **Muehlenbeckia**

1. **RUMEX** L. See Reehinger (1935)

1. Flowers bisexual; tufted leafy herb with perennial rootstock.

2. Inner lobes of fruiting perianth toothed on the margins.

3. Inner lobes of fruiting perianth stiff with slender acuminate or subulate apices.

4. The majority of flower clusters with less than 12 flowers.

5. Radical leaves narrow oblong, petiolate; stem leaves narrow linear and subtending the spreading branches and sparse flower clusters of diffuse panicle; internodes of panicle long; teeth and apex of the inner lobes of the fruiting perianth subulate but not hooked. Native species but not common in the A.C.T.; also in New South Wales, Victoria, South Australia, and Tasmania. 'Wiry Dock'. Fig. 135D (fruit).

1. **R. dumosus** A. Cunn. ex Meisn.

5a. Radical leaves oblong on slender petioles; stem leaves not numerous; panicle with few narrow almost erect branches, leafless or almost so, internodes long between flower clusters, pedicels recurved; fruiting perianth with the inner lobes reticulate-pitted, tubercles absent, the marginal teeth subulate and more or less hooked like the subulate apices. Found throughout eastern and southern Australia and Tasmania. Common in grassland and damp

or low lying areas in the A.C.T. and sometimes persistent in lawns. 'Swamp Dock'. Fig. 135A (plant and fruit).

2. **R. brownii** Campd.

4a. Resembling **R. brownii** but leaves narrower and with narrow linear leaf bracts subtending the main branches of the larger panicle; *clusters of flowers dense (more than 12)*, internodes long; *inner lobes of fruiting perianth with prominent tubercle when fully mature*, the teeth of the margins curved but not or scarcely hooked. Uncommon in the A.C.T., e.g. margins of Lake Burley Griffin, also Lake George (N.S.W.); a native species distributed from western slopes of New South Wales to South Australia.

3. **R. tenax** Rech. f.

3a. *Inner lobes of fruiting perianth scarious-reticulate and obtuse, at least 1 lobe with a conspicuous swollen tubercle in lower half, margin toothed below*; leafy herb, leaves oblong-ovate, crimped-undulate on margins; panicle erect, the dense fruit clusters reflexed to cover most of the internode below. Occasional in Canberra city area and wet sites at low altitudes; native to temperate areas of Europe and Asia, widely naturalised in temperate Australia and Tasmania. 'Broad-leaf Dock'.

4. ***R. obtusifolius** L.

2a. Inner lobes of fruiting perianth entire and developing conspicuous basal tubercles.

6. Radical leaves oblong to broad lanceolate on long slender petioles, margins undulate; stem leaves narrower, the uppermost subtending the branches and clusters in the *dense panicle in which the fruits are on pedicels as long as the broadly ovate inner lobes (3 mm. long) which have conspicuous tubercles in lower half*. Common in disturbed areas near creeks or in damp waste places, widespread in temperate countries including Australia and Tasmania but native to Europe, Asia, and Africa. 'Curled Dock'. Fig. 135C (fruit).

5. ***R. crispus** L.

6a. Radical leaves oblong to lanceolate on slender petioles and undulate on margins but smaller and narrower than in preceding species; stem leaves smaller and the uppermost subtending branches and flower clusters; panicle narrow, *clusters distant, flowers on short pedicels; fruiting perianth firm in texture, inner lobes oblong lanceolate, obtuse, 2 mm. long, tuberculate*. Common in disturbed areas and damp sites, distribution as for preceding. 'Clustered Dock'. Fig. 135B (fruit).

6. ***R. conglomeratus** Murray

1a. *Flowers unisexual* on separate plants (dioecious); perennial herb with underground rhizomes; *leaves hastate* with spreading auricles or the upper ones lanceolate; *flowers in loose panicles* which are reddish in colour or become so; *perianth lobes subequal*, about 1 mm. long, not very different in male and female but in the latter appressed to the nut when fruiting. Common in mountain pastures and grasslands, persistent in gardens (indicating acid soil conditions). Cosmopolitan. 'Sorrel'. Fig. 135E (male and female flowers). Sometimes referred to *Acetosella vulgaris* Fourr. sens. lat. or **R. angiocarpus** Murb. See Johnson and Briggs (1962).

7. ***R. acetosella** complex

2. **POLYGONUM** L.

1. Plants prostrate.

2. *Glabrous annual herb* with wiry stems; leaves oblong to lanceolate, 1-3 cm. long, *stipular sheaths thinly scarious, later splitting into fibres*; *flowers 1-4 in leaf axils*; *nut trigonous*, 2-2.5 mm. long. Cosmopolitan and widely naturalised, a common summer weed in gardens and on waste areas. 'Wireweed'.

1. ***P. aviculare** L.

2a. *Hirsute perennial herb*; leaves lanceolate or linear, 2-7 cm. long, *stipular sheaths commonly with a leafy outgrowth*; pinkish flowers subtended by brown bracts in *shortly pedunculate spikes 1.5-2.5 cm. long* from upper axils; *nut lenticular*, 2-2.5 mm. long. Widespread native species of Australia and introduced in New Zealand, common near creeks and along lower valley slopes. 'Creeping Knotweed'.

2. *P. prostratum* R.Br.

1a. Plants erect or ascendent; flowers in pedunculate spikes paniculate above the leaves and longer than them.

3. Plants glabrous or almost so; flowers less than 4 mm. long.

4. Tall annual herb; leaves lanceolate acuminate, *gland-dotted*, scabrid on margins and midrib, scarious stipular sheath truncate *not ciliate*; flowers pink in dense spikes 2-8 cm. long, *perianth lobes lacking (or with few) oil glands*; nut lenticular, 1.75-2.5 mm. long. Widespread in temperate regions of the world, growing on banks of creeks or along roadsides. 'Pink Knotweed'. Fig. 136.

3. **P. lapathifolium* L.

4a. Scarious stipular sheaths truncate with bristle-like cilia; flowers loose in slender spikes.

5. Leaves lanceolate, scabrid on margins and midrib, *not gland dotted*; flowers green or reddish in slender shortly pedunculate racemose spikes from upper axils and leafy at base; spikes 3-8 cm. long, *perianth lobes with conspicuous oil glands*; nut lenticular, 2-3 mm. long. Widespread in temperate regions, common in shallow running water, on sand banks in creeks and rivers or in swampy ground. Leaves have a burning taste when chewed. 'Water Pepper'.

4. **P. hydropiper* L.

5a. Leaves lanceolate with obtuse base narrowed to very short petiole, margins with stiff erect hairs; flowers pinkish in slender pedunculate (commonly paired) spikes 2-5 cm. long; *perianth lobes without oil glands*; nut lenticular (in local plants), 2 mm. long. Not common in the A.C.T. but grows in shallow water or muddy ground. A representative of Australian material formerly referred to *P. minus* Huds. but differing in non-annual habit and differing from *P. minus* subsp. *decipiens* (R.Br.) Danser in shorter cilia on ochreae (sheaths) and bracts and in the lenticular nuts. Native?

5. *P. salicifolium* Brouss. ex Willd.

3a. *Plants to 2 metres high, stems and stipular sheaths villous or hirsute*, sheaths ciliate, *leaves densely pubescent*, broadly lanceolate to ovate with slender acuminate apices; flowers bright pink in cylindrical spikes 2-8 cm. long in terminal panicle; *bracts hirsute, coloured*; *perianth 4-6 mm. long*. A garden species native to India and eastern Asia, now partially naturalised in the A.C.T. 'Garden Polygonum'.

6. **P. orientale* L.

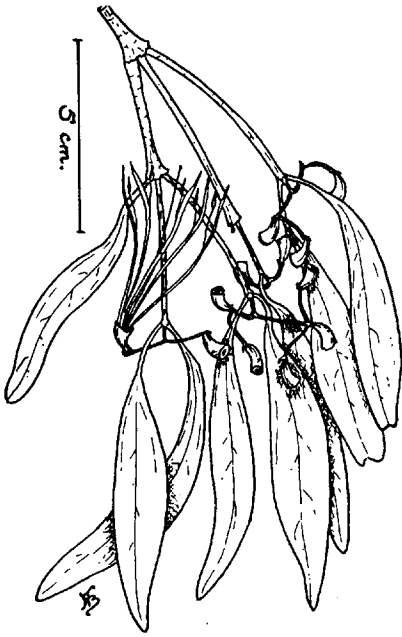
3. MUEHLENBECKIA Meisn.

Woody perennial with low-growing matted prostrate stems rooting at the nodes; leaves ovate to orbicular, rounded obtuse 3-6 mm. long, 2-4 mm. wide, petiolate; flowers minute, solitary or 2-3 in upper axils or at ends of branches, subtended by brown scarious bracts; fruiting perianth subsucculent, nut shining and trigonous. Open habitats in Upper Cotter Valley; also from Southern Tablelands (higher levels) of New South Wales to Tasmania and New Zealand. Fig. 137.

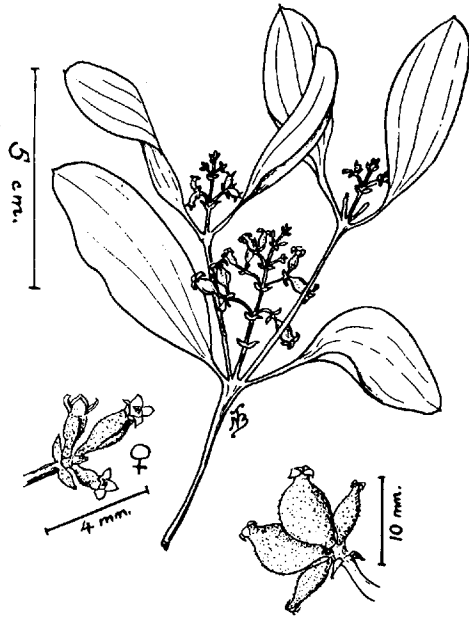
M. axillaris (J. D. Hook.) Walp.

CHENOPODIACEAE

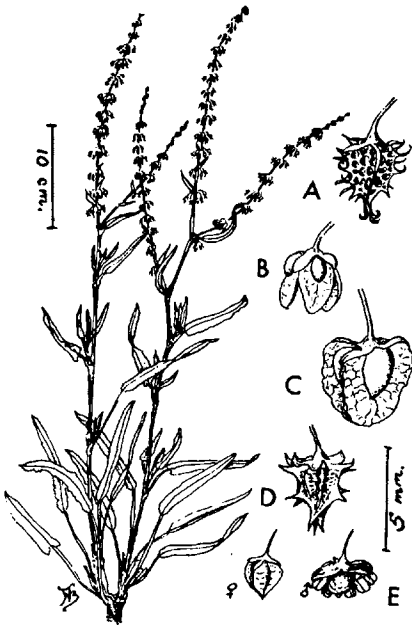
1. Perianth 5-lobed, seed horizontal or vertical and enclosed in a dry or fleshy pericarp.



133. *Muellerina eucalyptoides*



134. *Notothixos cornifolia*



135. A. *Rumex brownii*
 B. *Rumex conglomeratus*
 C. *Rumex crispus*
 D. *Rumex dumosus*
 E. *Rumex acetosella*



136. *Polygonum lapathifolium*

2. Fruit a red fleshy berry.

1. **Rhagodia**

2a. Fruit dry, seed black or brown, pericarp adherent or loose.

2. **Chenopodium**

1a. Perianth absent in female flowers, seed vertical between 2 partially fused bracteoles.

3. **Atriplex**

1. **RHAGODIA R.Br.**

Prostrate or decumbent herb; leaves opposite or mostly so, hastate with spreading auricles or the upper ones lanceolate, glabrous or sparsely mealy, 1-3 cm. long, acuminate; flowers in short terminal panicles; perianth 1 mm. long, lobes spreading below red fleshy berry 3 mm. in diameter; seed horizontal, black. Widespread in temperate and arid areas of Australia. In woodland or dry sclerophyll habitats in the A.C.T. Fig. 138.

R. nutans R.Br.

2. **CHENOPODIUM L.**

1. Erect herbs with leafy inflorescences.

2. *Non-aromatic annual* herb with striate (commonly reddish) branches, *more or less covered with mealy vestiture*, to 1 metre high; leaves ovate, 3-5 cm. long, margins sinuate or irregularly toothed; upper parts of all branches forming leafy inflorescences; *perianth mealy*; seed horizontal, black and with adherent pericarp. Almost cosmopolitan in temperate regions, a common weed of gardens and waste areas in summer. 'Fat Hen'. Fig. 139.

1. ***C. album L.**

2a. Aromatic perennial herb (smelling of ants) with striate stems erect or ascendent to 1 metre high: leaves ovate to lanceolate, 5-20 cm. long, petiolate, margins coarsely and irregularly toothed, *gland-dotted below*; upper parts of all branches forming the inflorescence; *perianth glabrous*, seed horizontal, black. Occasional weed of waste ground, widespread in temperate regions, native to America. 'Wormseed'.

2. ***C. anthelminticum L.**

1a. Prostrate or ascendent aromatic herbs; flowers in axillary clusters (sometimes only in upper axils) or in short terminal panicles; perianth lobes hairy.

3. Annual; *leaves oblong or lanceolate*, petiolate, 0.8-2 cm. long, green but mealy with glandular hairs and with resin droplets on lower surface, margins sinuately lobed; flower clusters shorter than leaves, perianth lobes 5, linear, incurved over the black vertical seed which is not fully covered by the lobes. Native species widespread throughout southern and arid Australia, not uncommon in the A.C.T., especially on disturbed or overgrazed areas after summer rain, also in gardens. Being cyanogenic the green 'feed' in dry seasons may lead to stock poisoning. The species is close to **C. carinatum R.Br.** in which the perianth lobes are more distinctly crested and fully cover the seed.

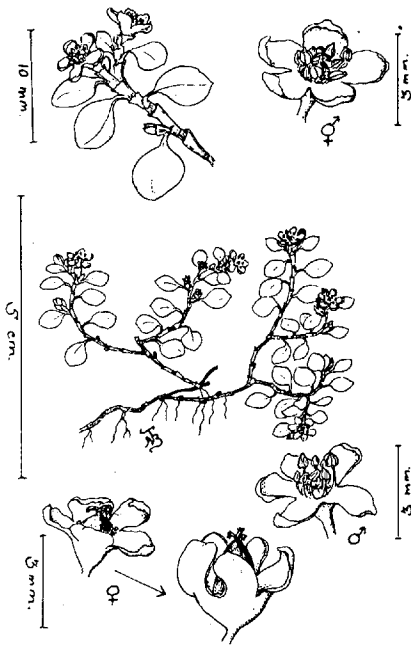
3. **C. pumilio R.Br.**

3a. *Perennial; leaves deeply pinnatisect*, hairy when young, 1-2 cm. long, lobes with recurved or revolute margins; flower clusters towards ends of ascendent branches; perianth lobes 3-5, pubescent mealy, seed vertical, brown. Native to South America, naturalised in waste ground and along roadsides. 'Scented Goosefoot'. (Sometimes referred to as **Roubieva multifida (L.) Moq.**)

4. ***C. multifidum L.**

3. **ATRIPLEX L.**

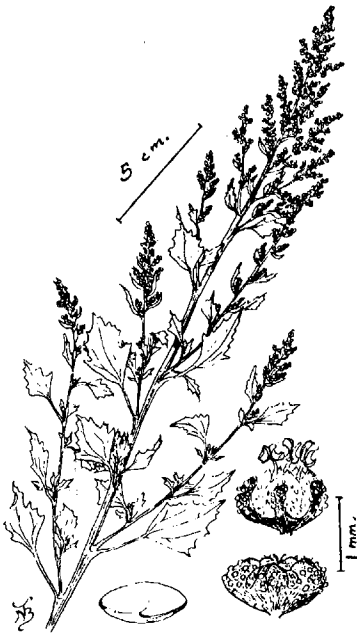
1. *Prostrate or erect* herb, stems and leaves mealy at least when young; *leaves oblong to lanceolate*, 1-2 cm. long, margins slightly toothed; flowers monoecious in terminal clusters or in upper axils with female flowers below the males or reduced to 1 or 2 females; *fruit of 2*



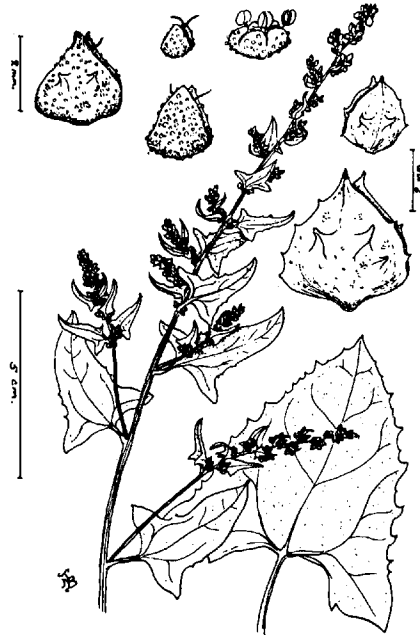
137. *Muehlenbeckia axillaris*



138. *Rhagodia nutans*



139. *Chenopodium album*



140. *Atriplex hastata*

subrhomboid bracteoles 4-6 mm. long, fused at the base where they become reddish and fleshy when mature and enclosing the vertical seed. A common species of southern arid Australia persisting in the Duntroon area from experimental plantings of some years ago. 'Creeping Saltbush'.

1. *A. semibaccata* R.Br.

1a. Ascendent herb to 60 cm. high, branches striate and often red at the nodes; leaves petiolate, opposite or alternate above, *triangular hastate with spreading lobes* from the broadly triangular base, lower ones to 7 cm. long, upper smaller and grading into the oblong bracts of the lower parts of the inflorescence, glabrous above, mealy or glabrescent below, margins with distant shallow teeth or entire; male and female flowers in small clusters alternately spicate along ends of branches; perianth of male flowers 5-lobed, reddish and mealy, smaller than the more numerous females; bracteoles of female flowers cordate-ovate, acuminate, *free almost to base, dimorphic, the larger toothed on margins and with blunt appendages on the backs, the smaller less toothed and without appendages*, mealy when young, seeds 2-3 mm. diameter between larger bracteoles, 1-2 mm. between smaller. Of European origin, naturalised in Fishwyck-Duntroon area in vicinity of Lake Burley Griffin. Fig. 140.

2. **A. hastata* L.

AMARANTHACEAE

1. Erect branched herbs, flowers usually monoecious, in dense spicate panicles or short axillary spikes, seed shining and enclosed in a circumsciss utricule, leaves alternate.

1. *Amaranthus*

1a. Prostrate herbs with flowers bisexual, in axillary clusters, leaves opposite, fruit flattened and dry.

2. *Alternanthera*

1. *AMARANTHUS* L.

1. Flowers in dense compound spicate panicles; perianth segments usually 5; leaves with well-developed petioles.

2. *Stems densely pubescent* with crisped hairs, root often red; leaves broadly elliptical to broadly ovate, undulate, 3-12 cm. long; spikes ovoid cylindrical in a dense terminal leafy panicle, *bracts 4-6 mm. long* with subulate apices; perianth shorter than bracts, *segments spatulate truncate or emarginate* and mucronate, longer than utricule. Common summer weed of gardens and waste areas with seepage. Of North American origin but now widely naturalised in Australia and other temperate regions. 'Redroot'. Fig. 141.

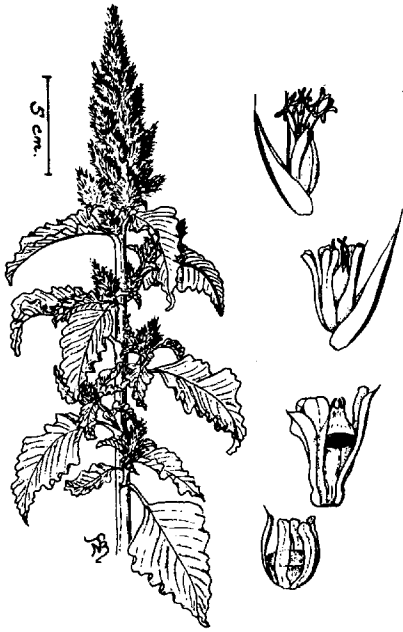
1. **A. retroflexus* L.

2a. Perianth segments lanceolate or elliptical, acute or acuminate and mucronate; stems glabrous or sparsely hairy in upper part; root sometimes pink or reddish.

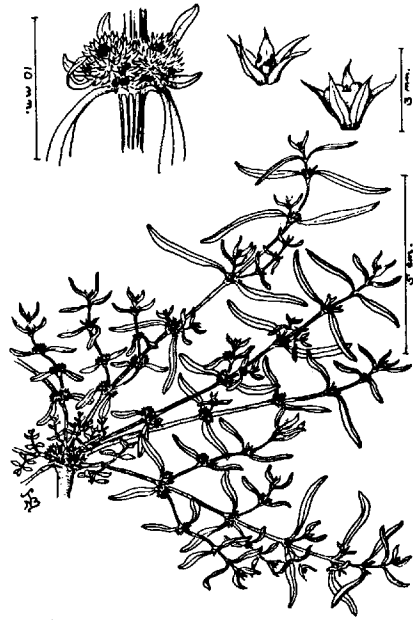
3. Leaves elliptical to ovate, acuminate, 3-9 cm. long, margins slightly undulate; spikes cylindrical, terminal or distant in the upper axils; bracts membranous at base with midrib passing into rigid green subulate apex almost as long; perianth segments $\frac{1}{2}$ as long as bracts (1-1.5 mm. long), thinly membranous and shining, not spreading below ripe fruit. Of American origin but now a widely naturalised weed of gardens and waste ground. 'Slim Amaranth'.

2. **A. hybridus* L.

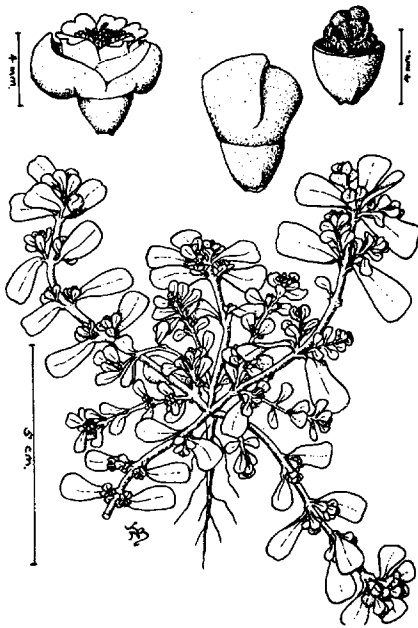
3a. Resembling the preceding but differing in having the bracts $1\frac{1}{2}$ times as long as the perianth and less glossy, broadly ovate and membranous apart from the green midrib which passes into a relatively short apex; perianth segments scarious and less glossy than in preceding, spreading below the ripe fruit. Owing to the shorter bracts the inflorescence has a less 'spiky' appearance than the preceding. Of American origin, naturalised in Europe



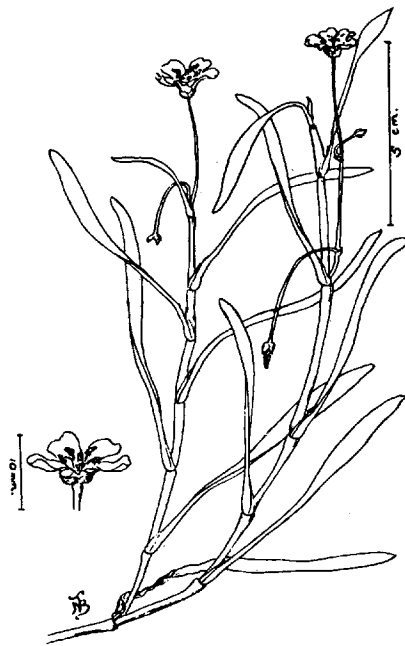
141. *Amaranthus retroflexus*



142. *Alternanthera denticulata*



143. *Portulaca oleracea*



144. *Neopaxia australasica*

and other parts of the world. Less common than the above with which it is easily confused.

3. **A. cruentus* L.

1a. Stiff much branched annual with *pale* almost glabrous stems; leaves shortly petiolate, obovate to lanceolate, obtuse and mucronate, 1-3 cm. long, pale veins conspicuous; flowers in *short spikes in all leaf axils*; bracts 3-4 mm. long, lanceolate with subulate apices, longer than perianth whose 3 segments are about 2 mm. long; upper half of fruit wrinkled and greater in diameter than base. Of American origin but now widely naturalised in temperate regions of the world, occasional weed of the Canberra area. 'Tumbleweed'.

4. **A. albus* L.

2. *ALTERNANTHERA* Forsk.

1. Prostrate herb, stems often red with decurrent lines of hairs on opposite sides; leaves petiolate, *narrow linear to linear oblong, 2-4 cm. long, 1.5-3 mm. wide*, glabrous or with sparse hairs on margins and midrib, margins entire or obscurely toothed, stipular membrane ciliate or later glabrescent; flowers in globose or shortly oblong spikes clustered in the axils, *rhachis glabrous or with few hairs*, bracts ovate, acute, transparent-scarious, to $\frac{1}{3}$ as long as perianth; bracteoles more acuminate and nearly as long as perianth; perianth lobes 2-2.5 mm. long, white with prominent midrib, *translucent at base when young, later semi-opaque but not rigid, lanceolate acuminate, not broad at base*, margin not toothed; utricle cordate, *more than $\frac{1}{2}$ as long as perianth*. Widespread especially in warmer parts of Australia. Among boulders near creeks and rivers. Fig. 142.

1. *A. denticulata* R.Br.

1a. Prostrate herb differing from preceding in the *ovate to oblong-ovate leaves 0.5-5 cm. long, 3-6 mm. wide*, stipular membrane woolly ciliate, *woolly hairs on rhachis of spikes*; bracts ovate with slender reflexed apex, scarcely 1 mm. long, margins irregularly toothed; bracteoles similar but longer; perianth segments 3 mm. long, creamy and opaque, *when in fruit the midrib prominent especially on horny base below broad obtuse base of lobe, apex obtusely narrowed to short slender point*, irregularly and minutely toothed on margin; *utricle less than $\frac{1}{2}$ as long as perianth*, cordate but less deeply emarginate than in preceding. This appears to be intermediate between *A. denticulata* and *A. nana* R.Br. Locally it is usually found in impacted bare areas of soil in dry sclerophyll habitats.

2. *A. sp. ?*

PORTULACACEAE

1. Prostrate herb with succulent stems, flowers sessile in leaf axils, petals yellow.

1. *Portulaca*

1a. Flowers pedicellate; petals not yellow.

2. Leaves and stems not succulent, petals white; plants of damp sites, in swamps or shallow running water.

3. Creeping perennial, leaves alternate, anthers extrorse.

2. *Neopaxia*

3a. Small tufted annual, leaves opposite, decussate, anthers introrse.

3. *Montia*

2a. Plants of dry sites, leaves succulent, petals pink.

4. *Calandrinia*

1. *PORTULACA* L.

Prostrate succulent stems often reddish; leaves thick, glabrous, oblong-cuneate, 1-3 cm. long, turning black on drying; axillary flowers solitary or few together; sepals fleshy with scarious margins; petals 4-6 mm. long, cuneate, shortly united at base; seeds numerous, black, shining, escaping by circumscission of the obtuse fruit. Cosmopolitan but though

native forms have been referred to this, the one occurring as a garden weed in the A.C.T. may not be native. 'Pigweed', 'Purslane'. Fig. 143.

P. oleracea L.

2. **NEOPAXIA** Ö. Nilss. See Nilsson (1966a and b)

Variable herb either (1) forming dense mats in wet ground at high elevations or (2) weak stemmed with slender leaves or (3) long stemmed in running water (see Fig. 144); leaves alternate; flowers pedicellate in small cymes with minute scarious bracts; sepals broadly ovate, obtuse; petals to 1 cm. long and at least 4 times as long as sepals; stamens 5, opposite petals, style 3-branched; seeds black, shining, minutely punctulate, in 3-valved capsule. Common in wet or damp habitats at high elevations (with short spatulate leaves 1-2 cm. long) also in mountain creeks and swamps and running water at low elevations (leaves linear or linear-spatulate and to 10 cm. long); also south-eastern New South Wales, eastern Victoria, Tasmania and New Zealand. 'Snow Purslane', 'White Purslane'. A specimen from Mt Bimberi (Darbyshire 123) gave a chromosome count $2n = 96$. (Nilsson, 1966). Fig. 144.

N. australasica (J. D. Hook.) Ö.
Nilss.

3. **MONTIA** L. See Moore (1963)

Slender glabrous annual herb 2-20 cm. high; leaves opposite with the successive pairs at right angles (decussate), elliptical, 0.5-1.5 cm. long, petiolate; flowers pedicellate in small cymes which are terminal and also in upper axils; sepals orbicular or broad and truncate, 1 mm. long; petals slightly longer than sepals; capsule 3-valved; seeds black, dull with concentric rows of minute tubercles. In seepage areas at lower elevations but of cosmopolitan distribution. There are two subspecies represented in the A.C.T., the more common is subsp. **chondrosperma** (Fenzl) Walters in which the seeds are 1 mm. in diameter and the tubercles are blunt or flat-topped but distributed over the whole surface. The other is subsp. **amporitana** Sennen in which the seeds are less than 1 mm. diameter (about 0.75-0.9 mm.) and the tubercles around the keel are narrowly-conical. 'Water Blinks'. Fig. 145.

M. fontana L.

4. **CALANDRINIA** H.B.K.

Small herb with slender ascendent stems and swollen fleshy leaves mostly clustered near the base and 0.75-3 cm. long; flowers in terminal racemes, pedicels alternate and subtended by scarious bracts; sepals fleshy, broadly ovate, obtuse, 2 mm. long, slightly enlarged in fruit; petals pinkish-purple, slightly larger than sepals; stamens 5, styles 3; capsule exceeding sepals, seeds numerous, concentrically rugulose. Dry sclerophyll habitats at low elevations (Mt Majura, Molonglo Gorge) but widespread in southern and eastern Australia. Fig. 146.

C. eremaea Ewart

CARYOPHYLLACEAE

1. Sepals free or almost so.
2. Leaves without stipules, the pairs joined across the stem by a scarious membrane.
3. Sepals and petals 4, the latter entire or absent.
4. Capsule 4-valved.
- 4a. Capsule 8-valved.
- 3a. Sepals and petals 5.
5. Petals bifid.
6. Capsule cylindrical, opening with 10 teeth.

1. **Sagina**

2. **Moenchia**

3. **Cerastium**

- 6a. Capsule opening to base into 4-6-valves.
 - 4. *Stellaria*
- 5a. Petals entire or almost so; fruit 6-valved.
 - 5. *Arenaria*
- 2a. Leaves with scarious margins.
 - 7. Plants without glandular hairs; leaves not linear-terete.
 - 8. Flowers in short terminal leafless corymbose panicles.
 - 6. *Polycarpon*
 - 8a. Flowers clustered in the leaf axils.
 - 7. *Paronychia*
 - 7a. Plants with glandular hairs, at least on the calyx, and with linear-terete leaves.
 - 9. Capsule 5-valved.
 - 8. *Spergula*
 - 9a. Capsule 3-valved.
 - 9. *Spergularia*
- 1a. Calyx 4-5-toothed or 4-5-lobed.
 - 10. Flowers not enclosed in stiff chartaceous bracts.
 - 11. Calyx less than 3 mm. long, glabrous and hardened around the 1-seeded indehiscent fruit.
 - 10. *Scleranthus*
 - 11a. Calyx not hardened around fruit, more than 3 mm. long.
 - 12. Calyx glandular-hairy, ribbed by green nerves.
 - 13. Calyx 5-nerved; petals minute, red.
 - 11. *Gypsophila*
 - 13a. Calyx 10-nerved; petals white, pink, or dark red, longer than calyx and with an appendage at base of limb.
 - 12. *Silene*
 - 12a. Calyx glabrous, cylindrical, nerves inconspicuous.
 - 13. *Saponaria*
 - 10a. Flowers enclosed in an involucre of chartaceous bracts; petals deep pink.
 - 14. *Petrohragia*

1. SAGINA L.

1. Diffuse *annual*, often less than 10 cm. high, stems filiform; leaves linear-subulate, 4-8 mm. long, *mucronate*; flowers on filiform pedicels much longer than leaves, from upper axils; *sepals 1.5-2 mm. long, oblong-lanceolate*, hooded at apex; petals minute or absent; stamens 4; capsule 4-valved, in fruit about as long as the *loosely spreading sepals*; seeds brown, papillose. Of European origin, widespread in temperate regions. 'Pearlwort'. Fig. 147.

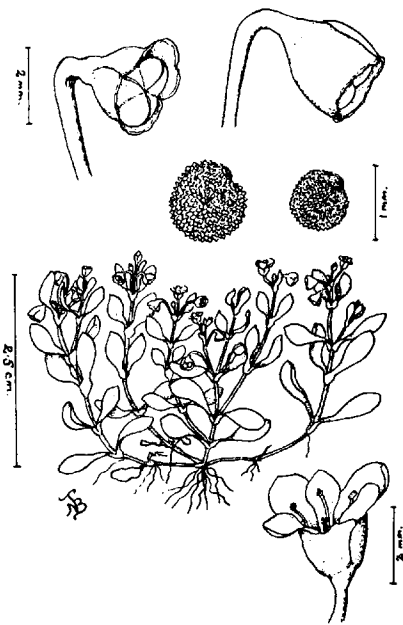
- 1. **S. apetala* Ard. subsp. *erecta* (Hornem.) Hermann

1a. *Perennial* herb with tangled stems rooting from lower nodes, often less than 6 cm. high; leaves linear, 3-9 mm. long, acute but *not mucronate*; flowers pedunculate as in preceding; *sepals 1-1.25 mm. long, oblong concave and rounded-obtuse*; petals about $\frac{1}{2}$ as long as sepals, membranous; stamens 4; *capsule about twice as long as and embraced by sepals*; seeds black rugose. This has been referred to *S. procumbens* L. but differs in leaves not mucronate, sepals close around a longer capsule and black rugose rather than papillose seeds. Native? Banks of creeks in peaty soil, Gudgenby and Murray's Gap.

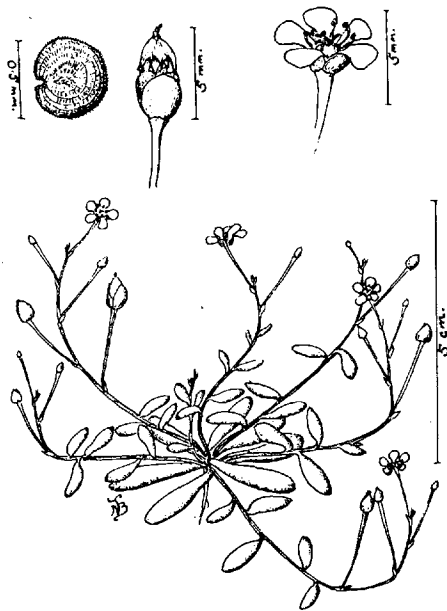
- 2. *S. sp.*

2. MOENCHIA Ehrh.

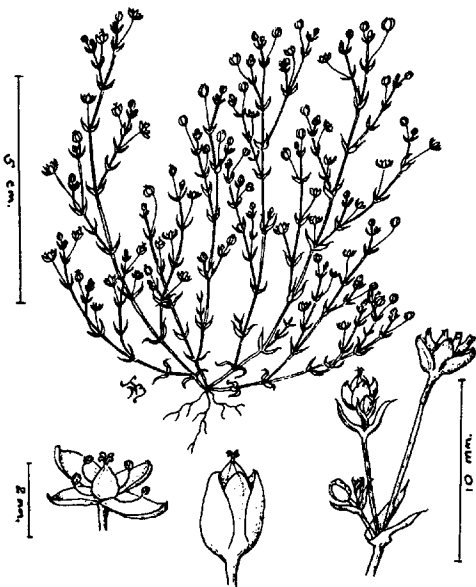
Annual herb, stems simple or branched above, glabrous; leaves linear to narrow lanceolate, acuminate, 5-14 mm. long, erect or spreading; flowers terminal or cymose from upper



145. *Montia fontana*



146. *Calandrinia eremaea*



147. *Sagina apetala*



148. *Moenchia erecta*

axils, on slender peduncles; sepals stiff, green with pale scarious margins, acuminate, longer than the obtuse membranous petals, stamens 4; capsule as long as calyx, 8-valved. Of European origin, widely naturalised and common in seepage areas in the A.C.T. 'Erect Chickweed'. Fig. 148.

**M. erecta* (L.) Gaertn. Mey. et Scherb.

3. CERASTIUM L.

1. Annual herb to 40 cm. high, villous with glandular and non-glandular hairs; lower leaves oblanceolate to obovate; stem leaves oblong to ovate, obtuse narrowed to connate bases, 0.7-2 cm. long; *flowers in dense terminal cymose clusters; sepals 4-5 mm. long, their upper hairs extending beyond the membranous apex*; petals about as long as sepals, notched; capsule 7-10 mm. long, seeds light brown, finally tuberculate, about 0.5 mm. in diameter. A cosmopolitan weed of temperate countries, common in the A.C.T. 'Mouse-ear Chickweed'. Fig. 149.

1. **C. glomeratum* Thuill.

1a. Upper hairs of sepals not projecting beyond apex; flowers not in dense clusters.

2. Perennial(?), hairs mostly non-glandular, *very short leafy shoots present in some leaf axils*; leaves elliptical or oblong, obtuse, 10-25 mm. long, 5-10 mm. wide; sepals 4-5 mm. long, margins and apex membranous; petals shorter than sepals; *capsule 8-12 mm. long; seeds brown, 0.4-0.8 mm. diameter, ridged-tuberculate*. A cosmopolitan weed of temperate countries.

2. **C. fontanum* Baumg. subsp. *triviale* (Murb.) Jalas

2a. Minor annual less than 12 cm. high, hairs glandular or non-glandular; basal leaves oblanceolate, to 10 mm. long, stem leaves ovate to broadly elliptical and smaller; sepals 3-4 mm. long, margins and apex membranous; petals shorter than sepals; *capsule 4.5-6 mm. long, seeds pale brown, less than 0.5 mm. in diameter*. Of European origin, a widespread weed in temperate areas.

3. **C. semidecandrum* L.

4. STELLARIA L.

1. Leaves petiolate, lanceolate to ovate, acute or obtuse.

2. Stems with a line of hairs up one side of each internode; petals shorter than sepals or absent.

3. *Plants to 25 cm. high; flowers in terminal leafy cymes; sepals 4-4.5 mm. long, sparsely pubescent, the inner ones with membranous margins; petals deeply bifid; seeds reniform, 1 mm. long, reddish-brown with rounded tubercles*. A common and widespread weed of European origin found throughout temperate areas of Australia and Tasmania. 'Chickweed'.

1. **S. media* (L.) Vill.

3a. Plants smaller than in above, *often less than 10 cm. high; cymes few-flowered, sepals glabrous or hairy 2-3 mm. long; petals lacking or minute; seeds light brown with obtuse conical tubercles*. Occasional weed of gardens and waste areas but locally less common than the preceding.

2. **S. pallida* (Dum.) Piré

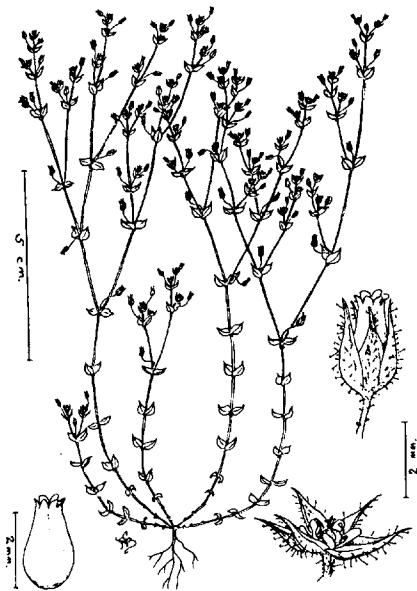
2a. Stems with *glabrous internodes* (rarely with scattered hairs), procumbent or ascendent, often long and more or less tangled; *petioles sparsely ciliate* with multicellular hairs which may extend to margins of leaves; *nervate leaf margins commonly undulate*; flowers axillary on slender pedicels 2-4 cm. long; *sepals 5-7 mm. long; petals longer than sepals, deeply bilobed*; seeds reddish-brown. In damp places of gully in Botanic Gardens, Black Mountain,



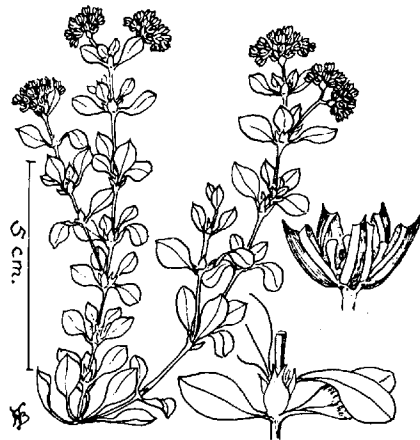
149. *Cerastium glomeratum*



150. *Stellaria pungens*



151. *Arenaria leptoclados*



152. *Polycarpon tetraphyllum*

probably introduced in soil from Clyde Mountain, New South Wales; also New South Wales, Victoria, and Tasmania.

3. *S. flaccida* W. J. Hook.

1a. Leaves linear or linear-lanceolate, stems glabrous or evenly pubescent.

4. *Perennial* herb with weakly ascendent branches forming loose tangles or mats, *internodes pubescent*; leaves sessile, narrow-lanceolate, acuminate, *apex pungent*, margins ciliate; flowers pedunculate in upper axils or terminal; sepals free, stiff, linear-lanceolate, 7-9 mm. long, 3-nerved, *apex rigid, subulate*; petals white, deeply bifid, about as long as sepals; capsule 3- or 4-valved; seeds orbicular-reniform. Native species very common in gullies or grassy sward especially under shade. New South Wales, northern Victoria to South Australia and Tasmania. 'Prickly Starwort', 'Prickly Knawel'. Fig. 150.

4. *S. pungens* Brongn.

4a. Leaves not pungent pointed; sepals without rigid subulate apices; stems glabrous; capsule 6-valved.

5. *Perennial* herb with weak trailing stems, resembling *S. pungens*; leaves 15-25 mm. long, sometimes scabrid on margins; *petals present*. Native species of damp habitats. 'Swamp Starwort'.

5. *S. angustifolia* W. J. Hook.

5a. Annual herbs, petals lacking.

6. Trailing or ascendent glabrous herb, *stem internodes often less than twice length of leaves*; leaves narrow lanceolate, acuminate, 5-10 mm. long; *lateral veins of sepals slender or obscure, scarious margins conspicuous*; capsule ovoid, about as long as sepals; seeds brown about 1 mm. diameter with conspicuous sculptured but blunt tubercles. In damp shaded forest sites, not common in the A.C.T.; also southern Australia and Tasmania.

6. *S. multiflora* W. J. Hook.

6a. Weakly ascendent herb, *stem internodes often more than 3 times as long as leaves*; leaves linear-lanceolate, 3-5 mm. long; *sepals 3-nerved, linear-lanceolate with narrow membranous margins*; capsule slender ellipsoidal, $1\frac{1}{2}$ -2 times as long as sepals; seeds grey-brown with small sculptured tubercles mostly around the outer curve. Black Mountain.

7. *S. aff. filiformis* (Benth.) Mattf.

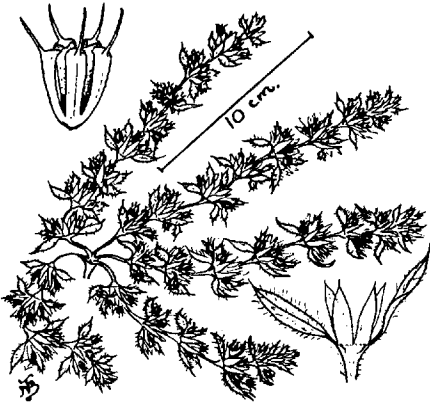
5. ARENARIA L.

Annual herb to 20 cm. high; stems branched (dichotomously cymose), retrorsely puberulent; leaves opposite, ovate, acuminate, scabrid with scattered multicellular hairs; flowers pedicellate in angles between branches, pedicels puberulent; sepals ovate-lanceolate with subulate apices, scabrid with multicellular hairs sometimes gland-tipped, subequal, 2.5-3 mm. long, inner ones with broader scarious margins; petals about $\frac{1}{2}$ as long as sepals, white, membranous; stamens varying from 0-10; styles 3; capsule about as long as sepals, narrowly ovoid, twice as long as broad, seeds reddish-brown (or black?), papillose. Close to *A. serpyllifolia* L. but differing in smaller flowers, narrower capsule and smaller seeds. Locally common on limestone soils in Paddy's River area. 'Lesser Thyme-leaved Sandwort'. Fig. 151.

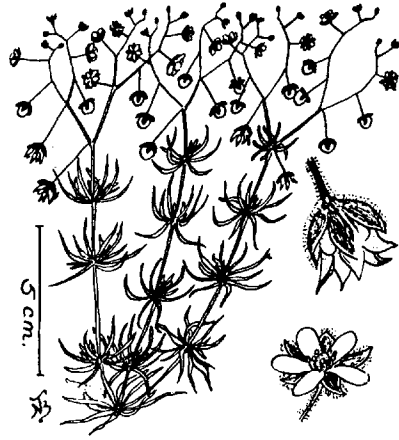
**A. leptoclados* (Reichenb.) Guss.

6. POLYCARPON Loeff. ex L.

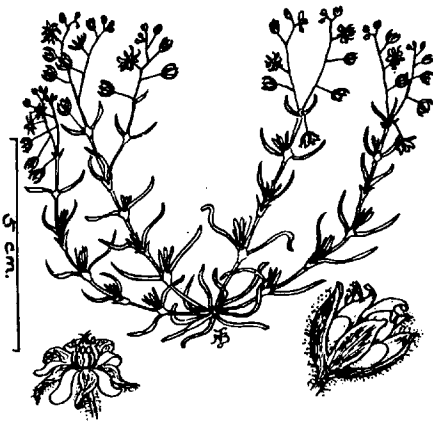
Prostrate or ascendent glabrous annual; leaves opposite or apparently in whorls of 4; stipules membranous and conspicuous; leaves oblong to obovate, 8-18 mm. long, narrowed into a slender petiole; flowers in paniculate cymes; sepals 2-3 mm. long with green centres, mucronate-apiculate and hooded at apex; petals white, minute; capsule shorter than calyx, 3-valved. Of European origin, naturalised in many countries including temperate parts of



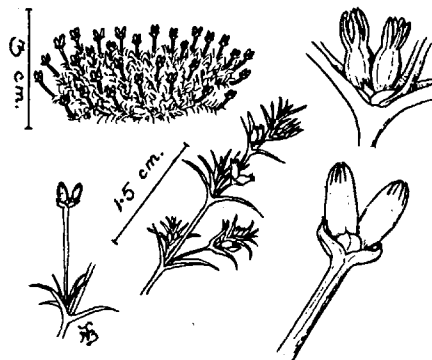
153. *Paronychia brasiliana*



154. *Spergula arvensis*



155. *Spergularia rubra*



156. *Scleranthus biflorus*

Australia. On waste areas or in gardens, sometimes in lawns. 'Four-leaved Allseed'. Fig. 152.

**P. tetraphyllum* (L.) L.

7. PARONYCHIA Mill.

Prostrate annual herb with scabrid-pubescent stems and leaves which are oblanceolate or elliptical, 4-11 mm. long with short slender petioles, apices mucronate; stipules conspicuous, silvery-scarious and almost as long as leaves; flowers sessile in axillary clusters subtended by a scarious bract; sepals 2-3 mm. long, linear-oblong with reddish centre and scarious margins, hooded above, aristate with small bristle near apex; petals absent; fruit 1-seeded and indehiscent. A native of South America now naturalised in many parts of temperate Australia. A weed of waste and cultivated areas. 'Chilean Whitlow'. Fig. 153.

**P. brasiliiana* DC.

8. SPERGULA L.

Decumbent or ascendent annual herb, sparsely glandular-pubescent; leaves linear-terete but channelled below, 1-5 cm. long, whorled, stipules scarious and 1-2 mm. long; flowers in terminal leafless cymes, pedicellate; sepals 2-3 mm. long (longer in fruit), glandular-hairy, margins scarious; petals white entire, about as long as sepals; pedicels reflexed in fruit; capsule 5-valved; seeds sharply keeled, black, orbicular, covered with club-shaped papillae or rough but epapillose. Occasional weed, sometimes in new lawns or near rubbish dumps, common at Yarralumla Nursery; of European origin but naturalised throughout temperate Australia. 'Corn Spurrey'. Fig. 154.

**S. arvensis* L.

9. SPERGULARIA (Pers.) J. et C. Presl.

Decumbent or ascendent annual or short-lived perennial, commonly glabrous below though glandular-hairy on inflorescence and young shoots; leaves linear-terete, 0.7-2 cm. long, opposite, with conspicuous acuminate scarious stipules; flowers pedicellate in upper axils or in terminal leafy cymes; sepals 3 mm. long; petals shorter than sepals, pink; fruiting pedicels spreading or reflexed; capsule 3-valved, seed swollen along back, testa minutely tuberculate. Widespread in temperate regions and in Australia and Tasmania; in the A.C.T. a common weed of waste and disturbed ground at all altitudes. 'Sand Spurrey'. Fig. 155.

**S. rubra* (L.) J. et C. Presl.

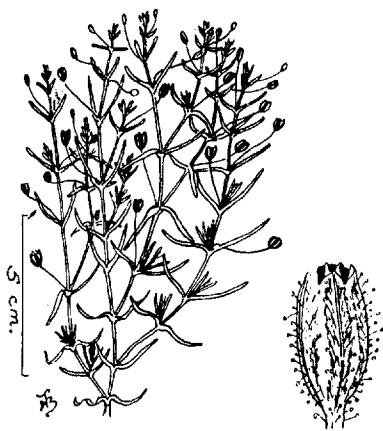
10. SCLERANTHUS L.

1. Perennial herb with *loosely tufted ascendent stems from a trailing or rhizomatous stem*; leaves connate at base, linear-subulate or trigonous, 4-7 mm. long, mucronate or aristate; *flowers numerous in axillary or terminal clusters*, subtended by bracts; calyx deeply divided into 5 sepals 2-3 mm. long; petals absent; *stamens 2*; ovary indehiscent and falling with calyx; New South Wales to Tasmania, locally found in grassy places or dry sclerophyll habitats at lower elevations, Canberra district, Molonglo Gorge, Naas etc. but also on mountain slopes.

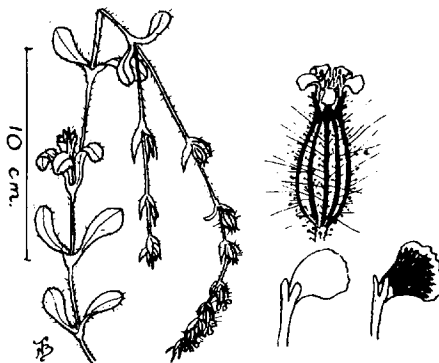
1. *S. diander* R.Br.

1a. Perennial herb commonly *forming dense cushions or mats 10-20 cm. in diameter* (looser in sheltered sites at lower altitudes); leaves linear-subulate or trigonous, 3-8 mm. long, connate at base, commonly with axillary leaf tufts or short shoots; *flowers sessile in pairs in upper axils, subtended by small ovate bracts at summit of stiff peduncle which soon elongates*; *calyx 4-lobed*, tube soon hardened and slightly swollen around indehiscent fruit; *stamen one*; fruiting calyx 2.5-3.5 mm. long. Very common in grassland and at most altitudes but especially at higher levels. New South Wales to Tasmania, also New Zealand. 'Two-flowered Knawel'. Fig. 156.

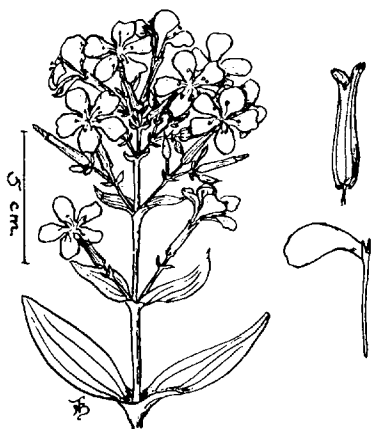
2. *S. biflorus* (J. R. et G. Forst.)
J. D. Hook.



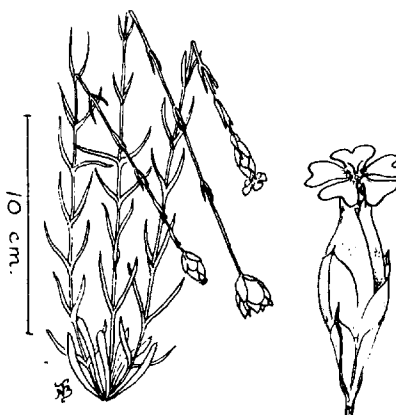
157. *Gypsophila australis*



158. *Silene gallica*



159. *Saponaria officinalis*



160. *Petrorhagia nanteuilii*

11. **GYPSOPHILA** L. *See Barkoudah (1962)*

Slender branched herb to 20 cm. high; leaves connate at base in scarious folds, terete, 1-2 cm. long; flowers axillary on slender peduncles which are glandular-hairy like the calyx and young shoots; calyx 4-5 mm. long, tubular with green sepals and white membranes, lobes very short; petals minute, pink or red, notched; capsule ovoid, opening in 4 valves. Occasional garden weed or on disturbed areas. Regarded as a native species but probably introduced into the A.C.T. from elsewhere in southern Australia; also New Zealand. Fig. 157.

G. australis (Schlecht.) A. Gray

12. **SILENE** L.

Hirsute or pubescent annual to 40 cm. high, sparsely branched, with septate and shorter glandular hairs mixed; leaves obovate, oblanceolate or oblong, 2-4 cm. long, linked by stipular membranes; flowers in terminal 1-sided racemes, subtended by leafy bracts; calyx 7-9 mm. long, tubular, 10-nerved with subulate lobes and white membranes, tube slightly inflated in fruit; petals not much longer than calyx, usually white or pink with slender claw and spreading orbicular or obcordate limb with two erect scales at the base. A common weed in spring and early summer, of European origin but widely naturalised throughout temperate Australia. 'French Catchfly'.

Note: var. **quinquevulnera** (L.) Mert. et Koch has a similar growth habit but the petals are larger and their limbs are dark red with a pale margin. See Fig. 158. It grows in similar habitats.

***S. gallica** L.

13. **SAPONARIA** L.

Perennial herb with glabrous stems and elliptical leaves with 3 conspicuous nerves on paler undersurface, 5-8 cm. long, apices acute-acuminate; flowers in terminal paniculate cymes; calyx tubular, 2-2.5 cm. long, nerved and bilabiate or split on one side; petals white or pinkish-mauve, about twice as long as calyx, with long slender claws and spreading limbs which each have two erect appendages at the base; stamens 10, exerted; capsule 4-valved. Occasional weed in the A.C.T., of European origin but naturalised in many parts of temperate Australia. 'Soapwort'. Fig. 159.

***S. officinalis** L.

14. **PETRORHAGIA** (Ser. ex DC.) Link *See Ball and Heywood (1964)*

1. Ascendent annual with simple erect stems or branched from near the base, stems glabrous or sometimes pubescent on central internodes; leaves mostly in lower half, linear, mostly 1.5-3 cm. long or basal ones longer, connate at base, the sheath short, usually not more than twice as long as broad; flowers in small terminal heads enclosed in dry light brown or straw-coloured bracts forming an ovoid-ellipsoid involucre, outer bracts mucronate, inner thinner and embracing the flowers; calyx thin, 1.2-1.5 cm. long, shortly lobed; petals with bright to deep pink bilobed limbs; capsule 4-valved, *seed 1.3-1.5 mm. long* with incurved margins, convex surface finely tuberculate; bracts loose on fruiting heads. A common summer weed widely naturalised in temperate Australia, introduced from Europe. 'Proliferous Pink'. Fig. 160.

1. ***P. nanteuilii** (Burnat) Ball et Heywood

1a. Differing from above in usually being more leafy at base, *leaf sheaths usually at least twice as long as broad, stems often conspicuously glandular-pubescent above the central nodes.*

seeds less than 1.3 mm. long and with sparser tuberculate papillae. Has been confused with above and probably similar in distribution. Black Mountain.

2. **P. velutina* (Guss.) Ball et
Heywood

Note: Australian specimens have formerly been referred to *Kohlruschia prolifera* (= *Tunica prolifera*). For this reason, Australian distribution of the above species cannot be definitely indicated.

RANUNCULACEAE

1. Herbs of tufted or stoloniferous habit, sometimes aquatic; leaves radical or alternate; petals yellow, rarely white; achenes with straight, hooked or curved beaks.

1. *Ranunculus*

1a. Slender twiners; leaves opposite; flowers white, unisexual; seeds with conspicuous plumose awn representing the persistent style.

2. *Clematis*

1. *RANUNCULUS* L. See Briggs (1959, 1962), Eichler (1958), Melville (1955, 1956)

1. Tufted perennial herbs (stoloniferous in *R. millanii* and *R. papulentus*) leaves all or mostly radical, stem leaves (if present) reduced in size and often without lobing; flowers on slender scapes as long as or longer than leaves or on branched stem much longer than the radical leaves.

2. Achenes with rigidly curved or hooked beaks; leaves pinnatifid or reduced to a ternately lobed upper segment.

3. Villous or hirsute plants; leaves with flat lobes; petals yellow (sometimes drying white within).

4. Leaves ternately divided with lateral segments petiolulate and ternately lobed or the leaf reduced to the terminal segment, lobes broadly obtuse or acute, petioles long; flowering stems much longer than the leaves, from almost simple with few distant small linear or elliptical bracts to much branched with ternately lobed stem leaves on short petioles; sepals reflexed, elliptical, hirsute, 5-7 mm. long; petals slightly longer than sepals, elliptical to obovate, obtuse, nectary lobe ovate-oblong and obtuse; achene 2-3 mm. long, lenticular with prominent marginal ridge, hairy along lower margin, beak at least $\frac{1}{2}$ as long and with hooked apex. Damp sites in mountain gullies and at higher elevations; southern and south-eastern New South Wales to Tasmania.

1. *R. scapiger* W. J. Hook.

4a. Sepals spreading; achenes glabrous.

5. Petals broadly obovate or cuneate; beak of achene 1-2 mm. long.

6. Leaves ternately divided with lateral segments petiolulate and ternately lobed or reduced to trilobed terminal segment, petiole long; flowering stem branched, stem leaves reduced and with narrow lobes or linear elliptical; sepals oblong-elliptical, hispid, 5-8 mm. long; petals 9-12 mm. long, nectary lobe cuneate and broader than long; beak almost as long as achene. Common in sclerophyll forest from lower elevations to alpine woodland and swamps at higher elevations; Queensland to Tasmania and South Australia. Fig. 161.

2. *R. lappaceus* J. E. Sm.

6a. Leaves ternately or biternately divided, less often with petiolulate lateral segments than the preceding; stem leaves few and near base or as distant narrow bracts above; flowering stems commonly unbranched; sepals ovate, hispid, 5-8 mm. long; petals 8-18 mm. long, nectary lobe oblong, truncate or emarginate; beak $\frac{1}{4}$ - $\frac{1}{2}$ as long as achene. Grassland on

well drained slopes at higher elevations, south-eastern New South Wales to eastern Victoria.

3. **R. graniticola** Melville

5a. *Leaves pinnate*, lower lateral segments petiolulate, all segments trilobed or crenate; stem leaves few and reduced to narrow oblanceolate blade; flowering stems unbranched or with 1 flowering lateral; sepals ovate, sparsely hispid, 3-6 mm. long; *petals elliptical to narrow-obovate, nectary lobe triangular, minute*; achene 1.5-2 mm. long, beak about 0.5 mm. Common in swampy sites in forest and grassland or in bogs from 3000 ft to higher levels in the A.C.T.; also eastern New South Wales to Tasmania.

4. **R. pimpinellifolius** W. J. Hook.

3a. *Plants stoloniferous*, commonly less than 10 cm. high; *leaves glabrous except at base of petioles, pinnately divided into 3-5 narrow linear-terete lobes*; flowering stems simple, shorter than leaves; sepals ovate-elliptical with few hairs, 2.5-3.5 mm. long; *petals white*, 5-8 mm. long, narrowly obovate, nectary a shallow pocket; achene 2-2.5 mm. long, margins not ridged, beak erect with recurved or minutely hooked tip, about $\frac{1}{2}$ as long as achene. Uncommon in the A.C.T., in depressions subject to inundation and in sphagnum swamps at high elevations (Mt Gingera); also high elevations from south-eastern New South Wales to Mt Wellington (Victoria).

5. **R. millanii** F. Muell.

2a. Plants sparsely hispid, *stoloniferous*; *leaves ternate, lateral segments elliptical or asymmetrically 2-lobed*, terminal segment entire or 3-toothed above; stem leaves mostly simple, few; flowering stem with few branches; sepals glabrous or hispid, ovate to oblong, 3-4 mm. long; petals 6-9 mm. long, elliptical to oblanceolate, nectary with short truncate lobe; achene glabrous, 1.5-2 mm. long, *beak subulate and at least $\frac{1}{2}$ as long*. Swampy ground or near water in sites below 2000 ft; A.C.T., Southern Tablelands, New South Wales, Gippsland in Victoria. The type specimen, Moore 3054, collected Canberra-Yass road 1 mile from Federal Highway.

6. **R. papulentus** Melville

1a. Plants with leafy stems, sometimes stoloniferous, radical leaves few or not persistent and not much different from the ternate or palmately lobed or dissected stem leaves; flowers mostly axillary on peduncles rarely more than twice as long as subtending leaf at flowering time.

7. Erect annual, *stem simple, to 40 cm. high, much branched above into a leafy panicle*; radical leaves few, not persistent, stem leaves on long slender petioles, lower ones deeply palmatifid with obtusely lobed segments, upper deeply toothed or finally oblanceolate and toothed (or entire under the flowers); sepals reflexed, broad oblong, thin, sparsely hairy, 2-3 mm. long; petals yellow, *obovate and shorter than or as long as sepals; receptacle oblong-cylindrical; achenes 1 mm. long, glabrous, apiculate*. Of European origin, naturalised locally and elsewhere in temperate Australia, Tasmania and New Zealand, usually growing in wet mud. 'Celery-leaf Buttercup'.

7. ***R. scleratus** L.

7a. Stem not simple and erect; fruiting receptacle short; achenes with short or long beak (except in **R. trichophyllus**).

8. Flowers more than 7 mm. in diameter; petals longer than sepals, obovate to oblong-lanceolate.

9. Annual, sparsely hispid, branched; radical and stem leaves (except uppermost) on long petioles, palmatifidly trilobed, lobes deeply crenate on lower leaves, toothed on upper, uppermost leaves cuneate and trilobed or oblanceolate; sepals recurved, elliptical, 5-8 mm. long, with scanty hairs; petals oblanceolate, 6-10 mm. long, nectary pouched with ovate lobe; achenes 3-4 mm. long with angular-ridged margins, *sides pale brown with conspicuous*

rigid curved tubercles, beaks flattened angular and more than $\frac{1}{2}$ as long as achene. Native to Mediterranean, naturalised in few damp gullies near settlements or along roads; temperate Australia. 'Sharp Buttercup'.

8. ***R. muricatus** L.

9a. Achenes without conspicuous tubercles; plants glabrous or almost so.

10. Plants annual or perennial, submerged in running water, *submerged leaves trichotomously dissected into filiform lobes*, petioles short; sepals broadly oblong or oval, 2-3 mm. long, glabrous; *petals white*, 3-5 mm. long, oblanceolate or elliptical; achenes obovoid, transversely rugose, apiculate. Cosmopolitan.

9. **R. trichophyllus** Chaix

10a. Perennial, in sites subject to inundation or submerged in shallow water; *leaves ternate or palmately lobed but lobes not filiform*; *petals yellow* (sometimes drying white within); achenes with slender beak at least $\frac{1}{2}$ as long.

11. Stoloniferous or rhizomatous, base of leaf tufts corm-like; radical leaves on very long petioles but otherwise similar to stem leaves, *palmatisect with branching linear lobes*; flowers axillary on peduncles much longer than subtending leaves; sepals oblong to elliptical, glabrous or sparsely hirsute, about 3 mm. long; petals oblanceolate to elliptical, *at least twice length of sepals*, nectary with blunt almost semi-circular lobe; achenes obovoid-lenticular, 1.5-2 mm. long, more or less irregularly rugose. Damp ground near water in sites below 2000 ft; also eastern districts from southern Queensland to Victoria. 'River Buttercup'.

10. **R. inundatus** R.Br. ex DC.

11a. Stoloniferous; bases of leaf tufts not cormlike; radical leaves few on long petioles and with narrower lobes than on stem leaves; *leaves ternate, the lobes crenate or deeply lobed*; flowers axillary on peduncles as long as or longer than subtending leaves; sepals glabrous, oblong-elliptical, 2.5-3 mm. long; petals greenish to pale yellow, *not much longer than sepals* (3-5 mm.), linear to oblanceolate, nectary placed high on narrow base and forming minute pocket; achenes obovoid, smooth or obscurely rugose, $\frac{1}{2}$ mm. long, beak broad at base. In wet sites above 3000 ft, commonly in shallow water (A.C.T.), southern New South Wales to Tasmania; also New Zealand.

11. **R. rivularis** Banks et Sol. ex DC.

8a. Flowers less than 5 mm. in diameter; petals few, as long as or shorter than sepals or absent; annual (in dry sites often less than 15 cm. high), hispid with spreading hairs; achenes flattened-lenticular with triangular beak about $\frac{1}{2}$ as long; petals and sepals soon deciduous.

12. Leaves palmatisect with crenate toothed or lobed segments or ternate with narrow segments; *flowers sessile*, axillary; sepals oblong, 1.5-2.5 mm. long; petals whitish, *narrow oblanceolate* and membranous, the nectary placed high with a triangular lobe; *achenes with scattered prominent tubercles each with a minute curved apical hair*. Dry sclerophyll forest habitats in shallow soils on gully slopes in the A.C.T.; widespread in southern and eastern temperate Australia including Tasmania.

12. **R. sessiliflorus** R.Br. ex DC.

Note: In var. **sessiliflorus** the leaves are palmatisect but in var. **pilulifer** (W. J. Hook.) Melville they are ternate with narrow lobes. The former is more common in the A.C.T. and the latter is suspected of being based on a hybrid with **R. pumilio**.

12a. Few stemmed herb or densely tufted in moister sites; *leaves ternate*, compoundly so (especially radical leaves) in vigorous plants, or with crenate lobes or narrow segments; *flowers pedunculate* (sometimes very shortly so); sepals oblong, about 1.5 mm. long; petals pale, *spathulate or obovate with narrow claw* above which is the minute lobe of the nectary;

achenes lenticular, *laterally covered with numerous recurved hairs arising from minute tubercles*. More commonly in damp sites than the preceding, especially in seepage areas in grassland and in gullies; also widespread in temperate Australia and extending to Tasmania.

13. *R. pumilio* R.Br. ex DC. var.
pumilio

2. CLEMATIS L.

1. Stems pubescent-villous, later glabrescent or with hairs at nodes; petioles slender, coiled at base; *leaves ternate, leaflets oblong lanceolate to ovate 3-7 cm. long, 3-nerved at base*, on slender petiolules 5-15 mm. long, margins with short lobes towards base or subentire, glabrous and paler beneath (in seedlings the leaves bicoloured with whitish markings); flowers white in axillary cymose panicles on very short peduncles or reduced to few flowers; pedicels long with pair of villous or sericeous bracteoles below middle; sepals 4, elliptical, 18-30 mm. long, the outer face villous-tomentose with paler tomentose margins, glabrous within; male flowers with numerous *stamens about ½ as long as sepals*, outer filaments flattened, *anthers narrow with slender appendage*; shorter than to as long as anther; female flowers with numerous densely villous carpels, the villous *styles to ½ as long as sepals*, some outer ones sterile and intermediate; achene flattened 5-6 mm. long, slightly oblique, *ribbed with spreading hairs*, the beak villous with spreading hairs continuous with those of plumose awn 25-40 mm. long. Climbing on shrubs and trees in sclerophyll forest, generally above 2000 ft. Widespread in southern and eastern Australia including Tasmania. 'Old Man's Beard', 'Clematis'. Fig. 162A.

1. *C. aristata* R.Br. ex DC.

1a. Differing from above in *leaves twice or thrice ternate with narrow oblong or oblanceolate lobes to 1 cm. long, 1.5 mm. wide*; sepals obscurely 1-nerved, linear-elliptical, 14-18 mm. long, sericeous with loosely appressed silky hairs outside, glabrous within; male flowers with *staminal filaments less than 4 mm. long, anthers shortly oblong, obtuse*; female flowers with almost glabrous carpels; *plumose styles slightly shorter than sepals*; *achenes 2-3 mm. long flattened ovate, glabrous or almost so, beak and base of awn pubescent, awn 15-20 mm. long, long-plumose*. Sclerophyll forests of lower slopes and in woodland areas; widespread in temperate Australia. Common names as for preceding. Fig. 162B.

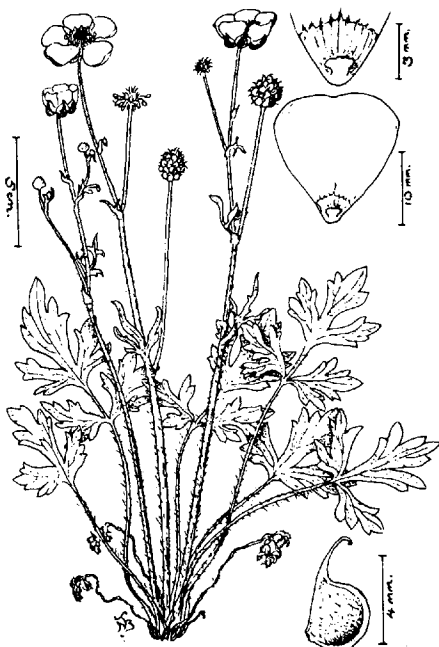
2. *C. microphylla* DC. var *leptophylla* F. Muell. ex Benth.

WINTERACEAE

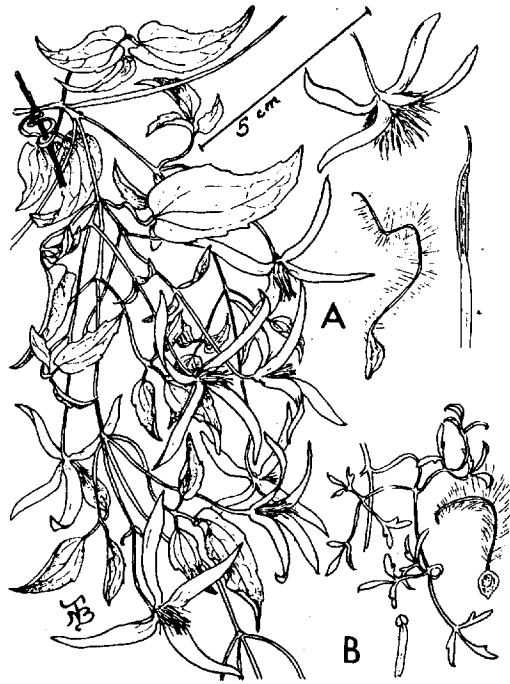
DRIMYS J. R. et G. Forst. See Willis (1957)

1. Diffuse shrub, smaller branches upcurved; *stems reddish, smooth or almost so, leaves spreading, elliptical to oblanceolate, shortly acuminate or acute*, glossy above (when fresh), paler below, to 10 cm. long; dioecious; flowers pedicellate in small terminal clusters (axis later growing on), female with 2 broad lanceolate or ovate sepals more or less fused except at narrow fimbriate apices, splitting up one side but soon deciduous; petals about 4, 2-4 mm. long, greenish or pale, elliptical lanceolate, about as long as sepals but narrow, later reflexed but at first the apices inflexed; *ovary of 1 semiglobose or ovoid carpel*; berry more or less globose, purple-black; male flowers with 2 broadly ovate-orbicular apiculate sepals much broader than 4-9 narrow oblong-elliptical petals and *soon deciduous*; stamens numerous, anther cells more or less parallel. In forests at higher elevations, especially among shrubs in cool moist gullies, e.g. near Bendora on old road to Mt Franklin; also in eastern New South Wales, eastern Victoria and Tasmania. The leaves have a burning taste if chewed, as do those of the following species. 'Mountain Pepper'. Fig. 163A (branch with female flowers).

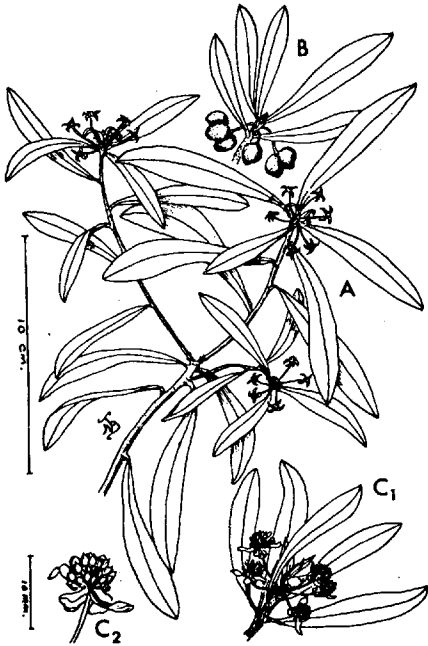
1. *D. lanceolata* (Poir.) Baill.



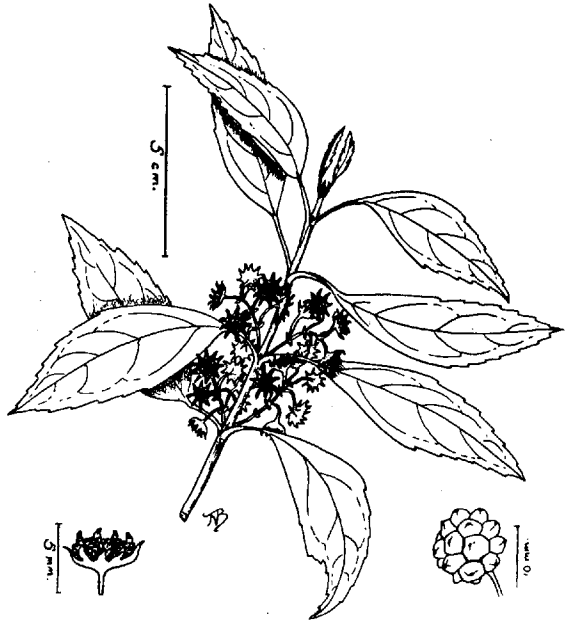
161. *Ranunculus laplaceus*



162. A. *Clematis aristata*
B. *Clematis microphylla* var.



163. A. *Drimys lanceolata*
B., C. *Drimys xerophila*



164. *Hedycarya angustifolia*

1a. Shrub of erect or bushy habit, branches less spreading than in preceding; *stems rough, more or less tuberculate*, reddish or pale; *leaves not conspicuously spreading, rarely more than 7 cm. long, narrowly to broadly oblanceolate, obtuse*, thick in texture, often drying reddish, inflorescence as in above; dioecious; female flowers with sepals not soon deciduous, outer petals broader than inner, *with 1-5 spreading carpels*; fruit a cluster of broadly ovoid berries; male flowers with sepals reflexed and falling with petals, petals 6-7 mm. long, anther cells finally back-to-back. More common at higher elevations than preceding species, especially in Snow Gum woodland. At Bendora (growing with *D. lanceolata*) it is a tall shrub to 2.5 metres high, at Snowy Flats on Mt Gingera it may be a rounded bushy shrub or (in exposed sites of upper ridges) a low shrub less than half a metre high; also Barrington Tops and south-eastern New South Wales, eastern Victoria. 'Alpine Pepper'. Fig. 163B (fruiting branchlet), C₁-C₂ (male flowers).

2. *D. xerophila* Parment.

MONIMIACEAE

HEDYCARYA J. R. et G. Forst.

Shrub or small tree, minutely pubescent with appressed hairs on young shoots and flowers; leaves opposite, petiolate, ovate elliptical to oblong-lanceolate, 6-12 cm. long, margins toothed or subentire, acute to acuminate; flowers in short axillary racemes, pedicellate, male flowers with numerous stamens; female flowers with reflexed lobes, the numerous carpels becoming fleshy in mulberry-like fruit 6-10 mm. long. Growing with tree ferns in the gullies of the Blue Range area, growing under marginal conditions climatically so far as the A.C.T. is concerned; also found in eastern forests and rainforests from Queensland to King Is., Bass Str. 'Native Mulberry'. Fig. 164.

H. angustifolia A. Cunn.

LAURACEAE

CASSYTHA L.

1. Leafless stem parasite with twining or trailing more or less *glabrous stems* tangled together over the host plant; flowers in short spikes, rachis and bracts minutely pubescent; drupe globular, 6-8 mm. diameter, more or less *glabrous*, drying black. In dry sclerophyll forest, flowering spring to summer; throughout temperate Australia and Tasmania. 'Devil's Twine'. Fig. 165.

1. *C. melantha* R.Br.

1a. Less robust than preceding and *minutely pubescent on young stems* as well as inflorescence; flowers in short spikes or clusters; drupe subglobular, 4-8 mm. diameter, *pubescent*, drying black. Dry sclerophyll forest habitats, flowering late summer, more common in the A.C.T. than preceding; throughout Australia and Tasmania. 'Devil's Twine'.

2. *C. pubescens* R.Br.

PAPAVERACEAE

1. Sepals connate in an acuminate hood pushed off by the expanding petals; capsule dehiscent by a long slit.

1. *Eschscholzia*

1a. Sepals 2 or 3, not forming a hood.

2. Capsule glabrous, hirsute or with soft spines.

3. Seeds escaping through pores.

2. *Papaver*

3a. Seeds escaping through lateral slits.

3. *Romneya*

2a. Capsule covered with sharp spines; seeds escaping through 3-6 valves.

4. **Argemone**

1. **ESCHSCHOLZIA** Chamisso

Glaucous perennial herb, leaves mainly basal with long slender petioles and ternately divided into narrow linear segments; flowers solitary on terminal peduncles; sepals connate in acuminate hood 2-2.5 cm. long; petals orange, cuneate, 3-3.5 cm. long; capsule narrow linear, striate. Garden escape of western American origin naturalised on sandy banks of rivers and less often elsewhere. Flower size varying between warm and cold season. 'California Poppy'. Fig. 166.

***E. californica** Chamisso

2. **PAPAVER** L.

1. Annual, *stems and leaves with stiff spreading hairs or bristles*; leaves deeply pinnatifid, lobes serrate and each with a terminal bristle; petals pink-red or brick-red; stamens pale; capsule glabrous, ovoid-oblong, 1.5-1.75 cm. long. Of South African origin despite its common name, widely naturalised in temperate Australia and erroneously regarded as native. 'Native Poppy'.

1. ***P. aculeatum** Thunb.

1a. Stems hairy or smooth but without stiff spreading bristles.

2. Annual, stems hairy; leaves scabrid, pinnatifid with narrow or linear and incised segments, paler beneath; peduncles long, appressed hairy; petals red with dark spot at base; stamens purple; *capsule ovoid, covered with up-curved spreading bristles*, 1-1.5 cm. long. Common garden weed in many parts of temperate Australia. 'Rough Poppy'. Fig. 167.

2. ***P. hybridum** L.

2a. Capsule smooth and glabrous.

3. *Leaves without stem-clasping bases, pinnatifid*; staminal filaments slender; calyx with bristles.

4. *Stems and leaves villous*; leaves pinnatifid with lobed segments; petals *scarlet without conspicuous dark spot at base*; capsule longer than broad, 1.5-2 cm. long. Occasional weed on disturbed or cultivated ground, uncommon in the A.C.T. though widely naturalised in temperate Australia. 'Long-headed Poppy'.

3. ***P. dubium** L.

4a. *Stems and leaves with spreading hairs*; leaves pinnately lobed, lobes crenate or serrate; *peduncles with spreading hairs*; *petals red with dark spot at base*; stamens purple; capsule not much longer than broad, 1-1.5 cm. long. Naturalised in many parts of temperate Australia though rarely common, occasional in the A.C.T. 'Field Poppy'.

4. ***P. rhoeas** L.

3a. *Coarse glaucous annual, with few scattered stiff hairs on upper parts of stems*; *leaves stem-clasping*, pinnately lobed, lobes irregularly serrate with teeth having apical bristle or seta; petals pale violet with dark base; *staminal filaments dilated above*; capsule subglobular to ovoid, 5-6 × 3-4 cm. or smaller, stigmatic rays 5-8. Probably a garden escape, not common in the A.C.T. but commonly treated as a subspecies of **P. somniferum**, the large-flowered Opium Poppy sometimes seen in gardens; but differing in the presence of setose hairs, smaller flowers, smaller capsules with up to 8 rays (instead of 8-12) and a chromosome number of $n = 22$ instead of $n = 11$. Of Mediterranean origin. 'Small-flowered Opium Poppy'.

5. ***P. setigerum** DC.

3. **ROMNEYA** Harvey

Perennial herb of shrubby habit to 2 metres high, glabrous and subglaucous; leaves

5-12 cm. long, pinnatifid, lobes coarsely toothed on larger leaves, rhachis sometimes sparsely spinulose-ciliate; flowers shortly pedunculate from upper shoots; corolla 8-12 cm. in diameter; sepals glabrous, apiculate; petals white, crumpled and undulate; stamens orange; capsule ovoid-oblong, 2.5-3.5 cm. long, strigose with appressed bristles, dehiscing through valves which slit from top down; old fruits with a 'birdcage' of vertical fibres. Of Californian origin, a garden escape persistent in the Forrest-Yarralumla-lakeside area. 'Matilija Poppy'. Fig. 168.

***R. coulteri** Harvey

4. **ARGEMONE** L. See Owenby (1958)

Robust glaucous annual to 1 metre high, leaves coarsely pinnatifid, upper surfaces white-blotched along nerves, lobes spinose, acute; sap bright yellow; flowers terminal, cymose, 3-6 cm. diameter, closely subtended by upper leaves; buds oblong, sepals 3, sparsely spinose and horned from back near apex, horn 7-10 mm. long with about half its length a spine; petals pale yellow or almost white with yellow basal spot; capsule ellipsoidal, 2.5-3.5 cm. long, ribbed, clothed with slender rigid spines, glaucous, 3-6-valved. Of tropical American origin, widely naturalised in southern and eastern Australia; to be found on sand banks of upper flood levels near Murrumbidgee and Molonglo Rivers. 'Mexican Poppy'. Fig. 169.

***A. ochroleuca** Sweet

FUMARIACEAE

FUMARIA L.

1. Weak-stemmed decumbent annual, glabrous or slightly glaucous; leaves thrice pinnatisect with deeply lobed segments; racemes leaf-opposed, 12-15-flowered; flowers sometimes cleistogamous and small; in normal flowers sepals 2, peltately attached, *broadly ovate with spreading lobes in lower half but often entire or almost so above*, apiculate, 3-3.5 mm. long, 2-2.5 mm. wide; corolla 9-11 mm. long (with basal spur), usually pink with dark purple tips; *upper petal with upturned wings on darker section and with deep basal pouch (spur); lower petal with narrow margin which is erect at keeled apex*; capsule subglobose, 2 × 2 mm., obscurely rugulose, *narrowed below in flattened base which is as broad as top of flowering pedicel* (when fresh). Of European origin, a naturalised weed of gardens and well-watered waste areas; widespread in temperate Australia and Tasmania. Three subspecies are recognised in the *Flora Europaea* (p. 257) but the distinctions are difficult to apply in local material and separation may be even more difficult in plants with cleistogamous flowers. 'Fumitory'. Fig. 170A-A_s.

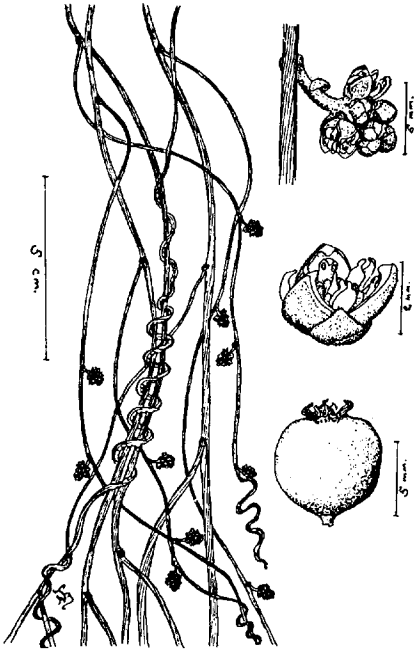
1. ***F. muralis** Sond. ex Koch sens. lat.

1a. Resembling the preceding but differing as follows: racemes often more than 15-flowered; *sepals oval, margins serrate with upwards directed teeth*, scarcely peltate at base, 1.5-2.5 mm. long, 1-2 mm. wide (see Fig. 170B₁); upper petal with wings extending below dark portion (sometimes appearing inflated below); lower petal with broad margins spreading towards apex; capsule 2.5 × 2.5 mm., rugulose to rugose, *not narrowed below and with basal flange broader than top of pedicel* (fresh or dry) (see Fig. 170B₄). Of similar origin and in similar habitats to the preceding. 'Fumitory'. Fig. 170B₁-B₄.

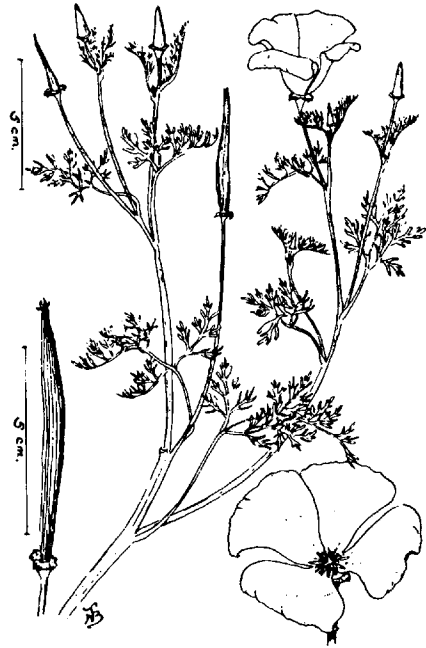
2. ***F. bastardii** Bor.

CRUCIFERAE (BRASSICACEAE)

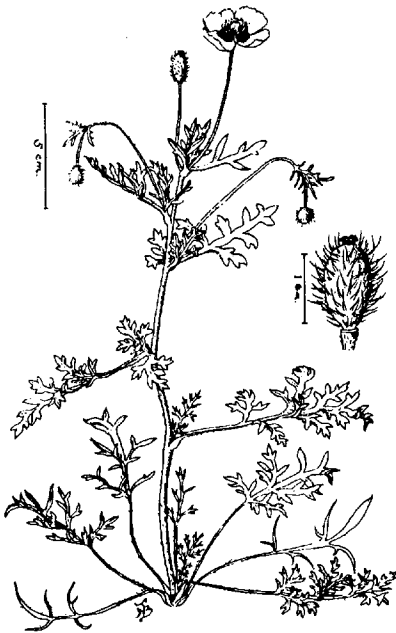
1. Septum of the fruit broad, i.e. the valves compressed from the back, or the siliqua more or less cylindrical and more than 3 times as long as broad (including beak if present).
2. Fruit with a beak-like portion above the valves.



165. *Cassytha melantha*



166. *Eschscholzia californica*



167. *Papaver hybridum*



168. *Romneya coulteri*

3. Fruit indehiscent, later breaking at constrictions between seeds; beak without seeds.
1. **Raphanus**
- 3a. Fruit dehiscent (siliquas), the seeds released by the falling valves; beak sometimes enclosing fully or partially developed seeds; valves 3-5-nerved.
4. Siliquas appressed to stem, beak commonly enclosing 1-2 seeds, seeds ovoid or oblong.
2. **Hirschfeldia**
- 4a. Siliquas not appressed to stem (A.C.T. species), beak with or without seeds; seeds spherical.
5. Siliquas hispid with flattened beak, 1-4-seeded in each valve.
3. **Sinapis**
- 5a. Siliquas glabrous with slender beak, with more than 4 seeds per valve.
4. **Brassica**
- 2a. Fruit not beaked, the persistent style very short in fruit.
6. Seeds in one row along the septum (see also **Rorippa**).
7. Valves with prominent midrib; petals yellow; naturalised weeds.
5. **Sisymbrium**
- 7a. Valves without prominent midrib, recoiled from septum at dehiscence; petals white or pinkish; herbs of forest and alpine woodland.
6. **Cardamine**
- 6a. Seeds numerous in 2 irregular rows (except one species of **Rorippa**).
8. Petals entire; leaves pinnatifid or pinnatisect.
7. **Rorippa**
- 8a. Petals bilobed; leaves entire, oblanceolate; minor herbs with white petals.
8. **Erophila**
- 1a. Septum narrow so that valves are compressed from sides and more or less boat-shaped or conduplicate, sometimes keeled or winged; fruit (silicula) always less than 3 times as long as broad.
9. Valves enclosing 1 seed.
10. Silicula dehiscent, ovate with a minute style in a minute apical notch.
9. **Lepidium**
- 10a. Fruit indehiscent.
11. Leaves with stem-clasping auricles and undulate serrate margins; flowers in corymbose panicles; silicula cordate with prominent style.
10. **Cardaria**
- 11a. Leaves pinnatifid, not stem-clasping; flowers in racemes; siliculas of subglobose valves.
11. **Coronopus**
- 9a. Valves enclosing more than 1 seed.
12. Siliculas cuneate-cordate with rounded lobes; flowers white; naturalised weed.
12. **Capsella**
- 12a. Siliculas longer than broad, ellipsoidal, valves with prominent midribs; narrow claws of petals and the staminal filaments purplish; native herb.
13. **Drabastrum**

1. **RAPHANUS L.**

Annual or biennial herb, stem scabrid below; radical leaves pinnatifid-lyrate but withered at flowering time, upper leaves similar or reduced to terminal segment; flowers racemose, older pedicels longer; petals lilac, white or yellowish, dark-veined, 1.5-2 cm. long, claw slender, limb obovate, fruit indehiscent, constricted between 1-seeded globular articles which are ribbed when dry; beak slender conical. Weed of temperate regions, of European

origin, not common in the A.C.T. but widely naturalised in temperate Australia. 'Wild Radish'. Fig. 171.

**R. raphanistrum* L.

2. *HIRSCHFELDIA* Moench

Annual or biennial herb, retrorsely scabrid; lower leaves grey-green, deeply pinnately lobed and lyrate; upper leaves finally oblanceolate and shortly toothed; racemes paniculate; petals yellow; siliquas adpressed, to 1.5 cm. long; valves 3-nerved; beak about $\frac{1}{2}$ as long as valves in fruit and often enclosing 1 (rarely 2) seeds. Very common summer weed of Mediterranean origin but now widely naturalised. 'Buchan Weed', 'Hoary Mustard'. Fig. 172.

**H. incana* (L.) Lagrèze-Foss.

3. *SINAPIS* L.

Annual herb, glabrous or sparsely scabrid; leaves lyrate-pinnatifid with large terminal segment; upper leaves on shorter petioles; racemes paniculate; petals yellow, 1.1-2.5 cm. long; siliquas spreading, valves 1-4-seeded, 3-5-nerved and hispid like the flattened beak. Crop plant of Mediterranean origin but now widely naturalised; rare casual in the A.C.T. 'White Mustard'.

**S. alba* L.

4. *BRASSICA* L.

Erect annual (or biennial?) herb to 1.5 metres high, taproot thick but not greatly swollen; basal leaves lyrate with large ovate-oblong obtuse crenate terminal segment, petiole winged and broader at base, glabrous or with sparse short bristles on margins and undersurfaces of main nerves; stem leaves lanceolate, oblong or obovate, sessile and stem-clasping, crenate or entire, obtuse, from 10-30 cm. long according to plant vigour; all leaves more or less glaucous, racemes with flowers in terminal cluster on level with buds, rhachis later much elongated; petals yellow, 8-15 mm. long, pedicels to 3 cm. long in fruit; siliquas fusiform-terete, 5-8 cm. long (including slender conical beak 1.1-2 cm. long), about 5 mm. in diameter; seeds irregularly 1-seried, brownish-black, testa minutely reticulate. Naturalised near rubbish dumps and on waste ground in vicinity of Canberra and representing one of the many cultivars developed from *B. oleracea* L. (Cabbage, Brussels Sprouts, Cauliflower, etc.), *B. napus* L. ('Swede Turnip') and *B. rapa* L. ('Turnip'). The interbreeding of these three species has been carried out for centuries and a definite placement of our material is difficult.

**B. aff. napus* L.

5. *SISYMBRIUM* L.

1. Siliquas spreading and slender.

2. Annual or biennial greyish-green herb, glabrous or sparsely hispid; lower leaves with large terminal segment and several triangular lateral lobes; upper leaves with narrow terminal lobe and slender lateral ones, or reduced to the hastate terminal segment; racemes paniculate; flowers small, *petals pale yellow, 5-7 mm. long; siliquas slender, to 10 cm. long*, sparsely hairy when young. Common widely naturalised weed of crops and waste ground. 'Indian Hedge Mustard'. Fig. 173.

1. **S. orientale* L.

2a. Annual or biennial herb with slender stems, glabrous or almost so; leaves deeply pinnatifid-lyrate, upper sometimes reduced to hastate terminal lobe; racemes paniculate, *flowers minute, petals pale yellow; siliquas 3-5 cm. long*, slender cylindrical on very slender pedicels, often slightly recurved, valves very thin and almost translucent; style minute. Widespread in temperate regions, a rare casual in the A.C.T. 'London Rocket'.

2. **S. irio* L.

1a. Annual or biennial herb with stiffly erect, retrorsely scabrid branched stems; leaves

deeply pinnatifid, radical ones with obtuse toothed lobes, upper with slender hastate terminal lobe; racemes paniculate, flowers very small, petals pale yellow; *siliquas hairy, closely adpressed to stem*, narrowed above, to 1.5 cm. long, valves with conspicuous midrib, persistent style minute. Weed of crops and waste or disturbed land; widely naturalised in temperate regions of the world. 'Hedge Mustard'.

3. **S. officinale* (L.) Scop.

6. *CARDAMINE* L. See *Thurling* (1968)

1. Flowers not more than 3 mm. long, greatly overtopped by developed siliquas; petals less than twice as long as sepals, white or almost so.

2. Annual(?) to 30 cm. high; radical leaves few, their bases not persistent at butt of plant; stems slender, leafy; leaves pinnatisect or pinnate; terminal leaflet 3-5-lobed or angled, lobes callose-apiculate; upper leaves with narrow leaflets, lateral ones ovate-lanceolate to oblong-lanceolate, acute terminal lobe with pair of acute lateral teeth; racemes terminal and from upper axils; *pedicels 2-3 mm. long in flower, about 5 mm. in fruit*; flowers few (i.e. opening one or two at a time) but racemes finally bearing up to 10 or more siliquas; sepals 1.5 mm. long, oblong, margins thin and pale; petals 2.5-3 mm. long, white, cuneate, rounded-obtuse, thin, *central nerve single in claw and few-branched above; style minute and not longer in fruit*; siliquas slender, flattened-quadrangular, 2-2.5 cm. long, 0.75-1 mm. wide; *seeds 1-1.25 mm. long, 0.5 mm. wide*. Bank of Gudgenby River at Glendale. (= species A of Thurling.)

1. *C. sp. A.*

2a. Perennial 20-30 cm. high, base of stem with persistent leaf bases; radical leaves sometimes withered at anthesis; pinnatisect with ovate to cordate, obtuse, apiculate, entire or crenate terminal leaflet; lateral leaflets petiolulate, ovate obtuse; lower stem leaves similar, upper pinnatifid, toothed or entire; racemes more robust than preceding; *pedicels about 1 mm. long in flower, to 12 mm. in fruit*; sepals 1.5-2 mm. long, oblong, white margin conspicuous above; petals 2.5-3 mm. long, spatulate, rounded-obtuse, *rather firm in texture with several parallel nerves at top of claw; style less than 0.5 mm. in flower but 1-1.5 mm. long in fruit*; siliquas compressed but valves more or less convex when mature, 2-3.5 cm. long, 1.25-1.5 mm. wide; seeds 2 × 1.5 mm. Near granite boulders at higher elevations. Fig. 174. (= species B of Thurling.)

2. *C. sp. B.*

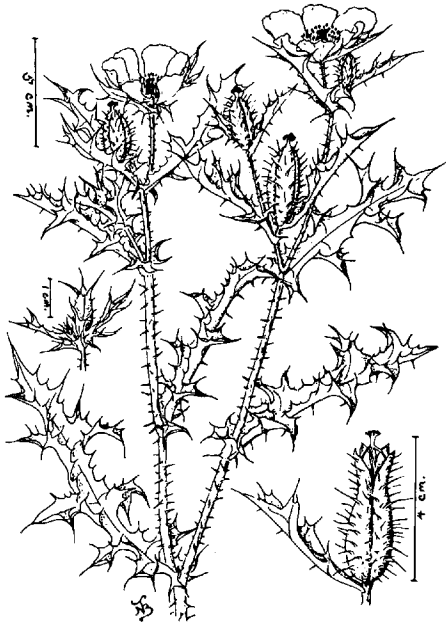
1a. Flowers more than 4 mm. long, not or scarcely overtopped by developing siliquas; petals at least twice as long as sepals; bases of old petioles persistent.

3. Commonly less than 20 cm. high; leaves mostly basal in dense cluster, radical leaves spatulate, petiole slender, blade ovate or oblong, entire or rarely with linear lobes or lyrate with narrow *sessile* lobes on petiole; stem leaves, if present, narrow with narrow lobes; *racemes with flower cluster usually about level with apices of developing siliquas*; pedicels not more than twice as long as sepals but lengthening to 8-12 mm. in fruit; sepals 2-2.5 mm. long, oblong, purplish with white margins; *petals white or purplish on outside, 5-6 mm. long, oblanceolate-spatulate with short 1-nerved claw; anthers straight or almost so; stigma subsessile, style to 1 mm. long in fruit*; siliquas 2-3 cm. long, 1 mm. wide; seeds 1 × 0.5 mm. In shallow soil or among snow grasses at high elevations on Mt Franklin. (= species D of Thurling.)

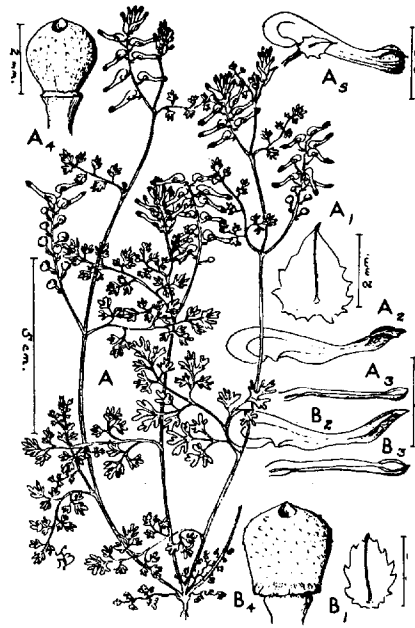
3. *C. sp. D.*

3a. Petals 8-11 mm. long; style 1-1.5 mm. long in flowers, lengthening to 3 mm. in fruit; flower cluster above the developing siliquas; petals bright pink or pinkish-purple outside, paler within; anthers strongly curved when older.

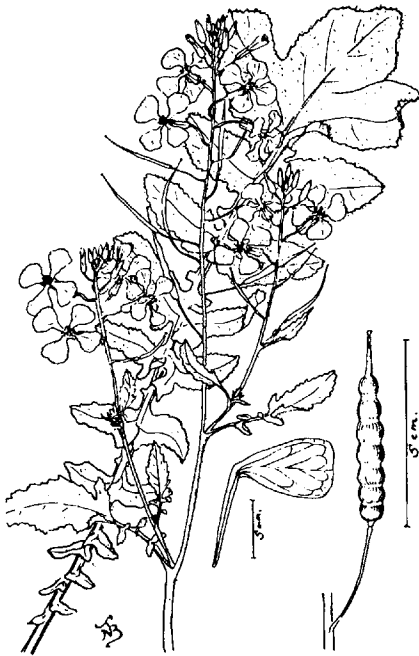
4. Plants 15-30 cm. high, *base of stem with horny-scarious pouched bases of old petioles*;



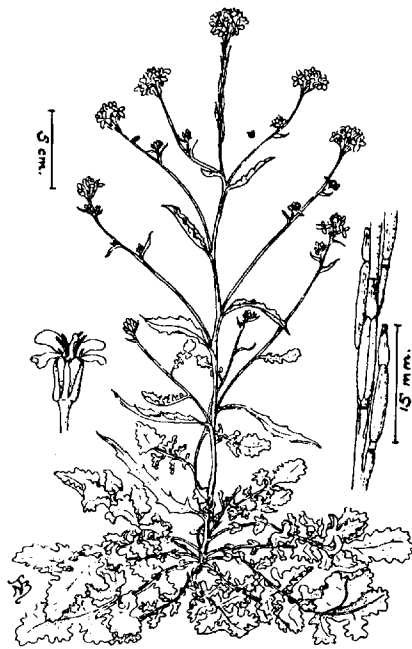
169. *Argemone ochroleuca*



170. A. *Fumaria muralis*
B. *Fumaria bastardii*



171. *Raphanus raphanistrum*



172. *Hirschfeldia incana*

lowest leaves with simple ovate or cordate blade on long slender petiole or pinnate, other basal leaves and lower stem leaves with 1-3 irregular pairs of oval to ovate-orbicular petiolulate leaflets below larger terminal one which may be entire or obscurely 3-lobed or with 3-5 shallow teeth; uppermost leaves with narrow leaflets or simple, lanceolate, obtuse; *racemes at first corymbose but elongating to more than 10 cm. long*; pedicels about 10 mm. long in flower and about 1½-2 times as long in fruit; sepals 3-3.5 mm. long, oblong in bud, lanceolate-oblong in flower, purplish with thin white margins; petals 8-10 mm. long with obovate obtuse limb and slender claw with 7 *parallel nerves passing into base of limb*; anthers sometimes purple; mature siliquas not seen. Sub-alpine woodland at high elevations. (= species C of Thurling.)

4. *C. sp. C.*

4a. Very slender plants to 50 cm. high, *bases of petioles persistent, crowded but not pouched*; leaves similar to those of preceding but thinner; stem leaves pinnatifid with elliptical or oblong acute or obtuse lobes or reduced to trilobed terminal segment or simple and narrow linear-lanceolate on slender petiole; *racemes loose and elongated*, flowers soon losing the early corymbose arrangement; pedicels very slender, 8-12 mm. long in flower, to 15 mm. in fruit; sepals 2.5-3 mm. long, oblong-lanceolate, purple with white margins; petals 8-11 mm. long, spatulate with broadly ovate rounded limb and *slender 1-nerved claw*, bright pink or purple-pink outside, paler within; style 1 mm. long in flower, to 3 mm. in fruit(?); siliquas very slender and at least 3 cm. long but not seen mature. Molonglo Gorge.

5. *C. lilacina* W. J. Hook.

Note: Annual species with scattered bristly hairs on leaves and siliquas and small white flowers have been recorded from Canberra gardens and nurseries and from the Cotter Caves area. These are *C. hirsuta* L. and *C. flexuosa* With. of European origin.

7. **RORIPPA** Scop.

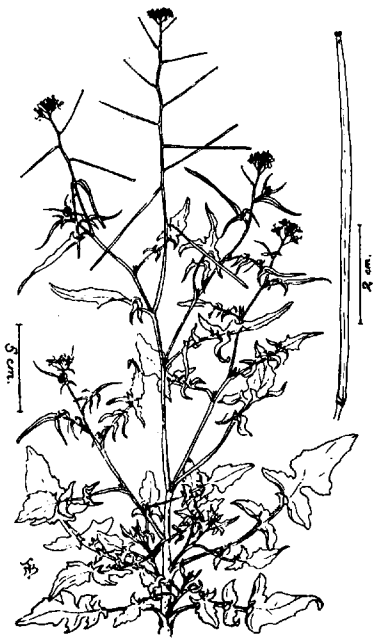
1. Annual or biennial herb, stems erect and often reddish; *leaves deeply pinnatifid-lyrate, lobes irregularly serrate*, terminal lobe narrow and obtuse to acuminate; racemes paniculate; *petals yellow*, 2 mm. long; *siliquas oblong, 8-9 mm. long* on pedicels of same length; testa of seeds with fine pattern of small cells. Widespread weed of temperate regions, grows in wet mud or sand, locally common in suitable sites in the A.C.T., such as margins of Lake Burley Griffin in Duntroon area. 'Marsh Water Cress'. Fig. 175.

1. **R. islandica* (Oeder) Borbas

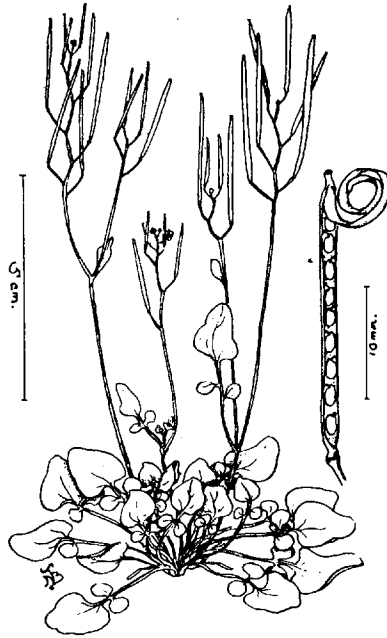
1a. Siliquas more than 1 cm. long; petals white; leaf segments entire or undulate on margins.
2. Perennial herb with decumbent stems rooting in mud or shallow water; leaves pinnatisect-lyrate, *lobes broadly elliptical, large terminal segment broadly ovate or orbicular*; racemes not much longer than leaves; *petals 3-4 mm. long*, almost twice as long as sepals; *siliquas linear-oblong, more or less abruptly narrowed to the style, 13-18 mm. long, 2 mm. wide with seeds in double row visible through convex valves; testa with about 25 polygonal depressions on each face*. Cosmopolitan in temperate regions, common in small water courses and creeks frequented by stock. 'Water Cress'. Wild plants should not be eaten due to risk of infection by Liver Fluke.

2. **R. nasturtium-aquaticum* (L.)
Hayek

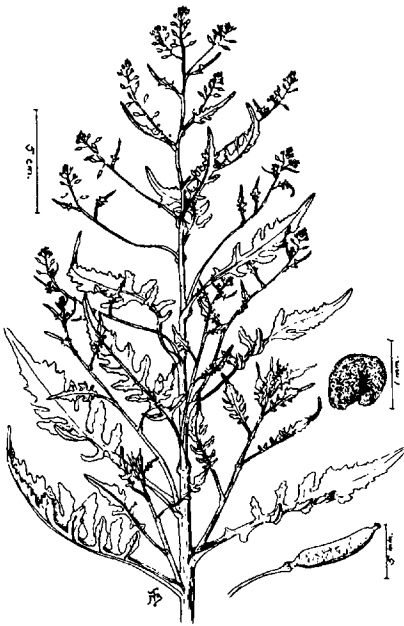
2a. Perennial herb similar to preceding; flowers slightly larger with *petals 4-5 mm. long*; siliquas slightly upcurved, *more or less gradually narrowed to style, 15-25 mm. long, less than 2 mm. wide with seeds in irregular single row; seed with numerous (about 100) polygonal*



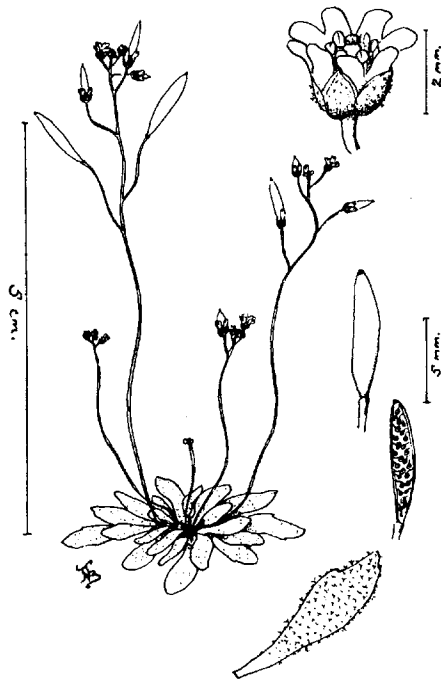
173. *Sisymbrium orientale*



174. *Cardamine* sp.



175. *Rorippa islandica*



176. *Erophila verna*

depressions on each face. Less common than preceding but in similar habitats. 'One-rowed Water Cress'.

3. **R. microphylla* (Boenn. ex Reichenb.) Hyl.

8. *EROPHILA* DC.

1. Minor annual herb, 3-8 cm. high; leaves in basal rosette, oblanceolate, entire or with few shallow teeth, *sparsely or densely clothed with forked and stellate hairs*; flowers racemose, petals white, bifid, 2 mm. long, pedicels lengthening to as long as or longer than the lanceolate or narrow *ellipsoidal siliculas* (6-8 mm. long). Common in pastures and open woodland areas in springtime, especially at lower elevations. Of European origin and widely naturalised in southern and south-eastern Australia. 'Whitlow Grass'. Fig. 176.

1. **E. verna* (L.) Bess. subsp. *verna*

1a. Similar to preceding but smaller with *pubescence mainly of simple hairs* with or without a few forked ones. *Siliculas broadly ellipsoid or suborbicular*, 4-6 mm. long, rarely more than twice as long as broad, pedicels slender. Less common than preceding but found in the same or similar habitats. 'Lesser Whitlow'.

2. **E. verna* (L.) Bess. subsp. *praecox* (Stev.) Walters

9. *LEPIDIUM* L.

1. *Siliculas* not or only narrowly winged towards apex; stigma sessile in broad notch; pedicels more or less terete and glabrous on undersurface; annual or biennial herbs.

2. *Stems pubescent; lower leaves doubly and upper ones simply pinnatisect*, pubescent or hirsute especially on lower parts; flowers minute in paniculate racemes which elongate in fruit; petals white, smaller than sepals; stamens 2 or 4; *siliculas broadly elliptical to suborbicular*, 3-3.5 × 2.5 mm., glabrous. Of South American origin, naturalised in south-eastern Queensland and eastern New South Wales. Rare, has been collected in the Molonglo Gorge.

1. **L. bonariense* L.

2a. *Stems glabrous, rigid, wiry; leaves narrow elliptical or oblanceolate, glabrous or sparsely ciliate, margins serrulate*, lower ones to 10 cm., uppermost to 1 cm. long; flowers minute in paniculate racemes much elongated in fruit; petals smaller than sepals, stamens 2 or 4; *siliculas ovate to ovate-oblong*, 2-2.5 × 1.5 mm. Common weed of gardens and waste ground, a native species widespread in higher rainfall areas of temperate Australia. 'Peppercress'. Fig. 177.

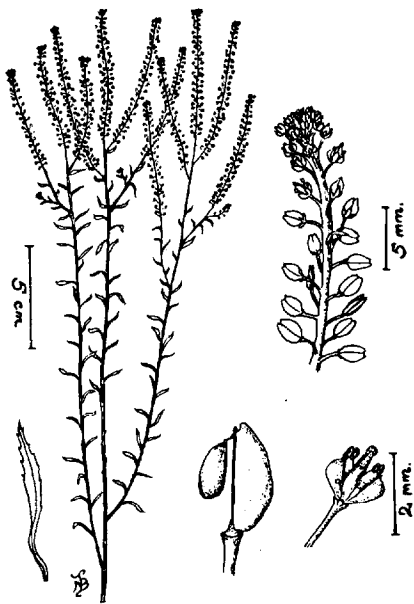
2. *L. hyssopifolium* Desv.

1a. *Perennial* with several branched stems from rootstock, stems more or less striate, *stems and leaves scabrid with minute blunt callosities; leaves narrow linear, entire, 7-15 mm. long*; flowers minute in terminal racemes elongated in fruit, sepals with thin white margins, sometimes vesiculate-papillose on the backs; *petals lacking*, stamens 4; *siliculas obovate, rounded-obtuse or almost truncate at summit*, 4.5-5 × 3-3.5 mm., *wings of valves forming about 1/3 of length*, sparsely vesiculate-papillose, stigma sessile in *minute narrow notch; pedicels flattened*, the thin margins scabrid. Lower slopes of Mt Ainslie in Reid area.

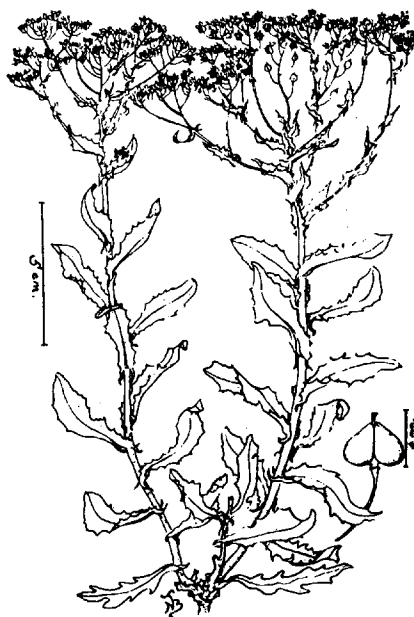
3. *L. aff. monoplocoides* F. Muell.

10. *CARDARIA* Desv. See Mulligan and Frankton (1962)

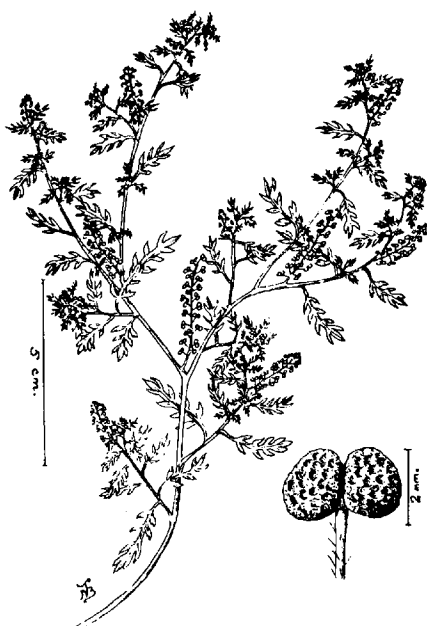
Erect hoary perennial herb, stem leaves broadly lanceolate to ovate-oblong with sinuate to toothed margins and stem-clasping auricles; upper leaves narrower and smaller; flowers pedicellate in corymbose panicles; petals white, twice as long as sepals; *siliculas cordate with rounded lobes at base, narrowed above to the prominent style, indehiscent*. A native of



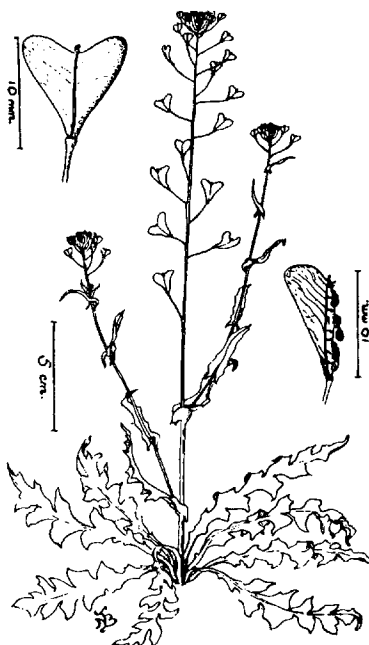
177. *Lepidium hyssopifolium*



178. *Cardaria draba*



179. *Coronopus didymus*



180. *Capsella bursa-pastoris*

Europe and Asia now naturalised in many parts of temperate Australia, an occasional weed in the Canberra area. 'Hoary Cress'. Fig. 178.

**C. draba* (L.) Desv.

11. CORONOPUS Zinn

Procumbent annual or biennial sparsely hairy herb; leaves pinnatifid with narrow elliptical lobes which may have a few teeth or (on lowest leaves) be again pinnatifid; racemes at first apparently terminal, later lateral but not axillary to leaves; flowers minute, pedicellate; petals shorter than sepals and white or lacking, fertile stamens 2; siliculas emarginate, broader than long with globose indehiscent pitted-reticulate valves about 2 mm. in diameter. Possibly of South American origin but now widely naturalised in temperate regions throughout the world. Occasional weed of cultivated and waste ground in the A.C.T. 'Bitter Cress', 'Lesser Swine Cress'. Fig. 179.

**C. didymus* (L.) J. E. Sm.

12. CAPSELLA Medik.

Annual herb, hispid with stellate hairs or glabrescent; radical leaves pinnatifid and more or less lyrate; stem leaves few, with stem-clasping auricles and a narrow entire or serrate blade; flowers minute in simple or branched racemes much elongated in fruit; petals white, to 2 mm. long; siliculas on long pedicels, triangular with broad notch at summit; valves enclosing several seeds. Of European origin, widely naturalised in temperate regions and in most parts of temperate Australia, very common weed of gardens and waste ground in the A.C.T. 'Shepherd's Purse'. Fig. 180.

**C. bursa-pastoris* (L.) Medik.

13. DRABASTRUM O. E. Schulz *See Shaw (1965)*

Small perennial herb to 20 cm. high; leaves glabrous or with few marginal hairs, mostly in basal rosette, oblanceolate with slender base, 1.5-3 cm. long, obtuse, margins with 1-3 pairs of teeth or shallow lobes; stem leaves often few, smaller with shorter bases; stems ascendent, simple or almost so, grey with branched or stellate hairs; flowers on hairy pedicels elongated after flowering; petals 4-5 mm. long, purplish below and pale above or purplish on back; filaments purple, anthers pale; siliculas shorter than pedicels, 5-6 mm. long, narrowly obovoid to ellipsoid, angled along septum, valves with midnerve, seeds irregularly 2-seriate. Not common in the A.C.T., has been collected above junction of Paddy's and Cotter Rivers; also high elevations of south-eastern New South Wales and north-eastern Victoria.

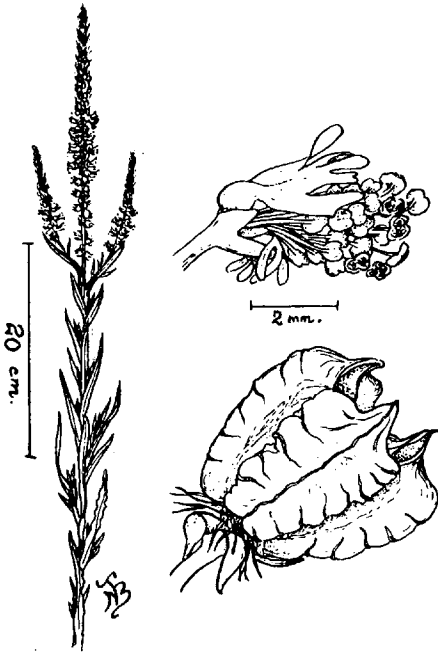
D. alpestre (F. Muell.) O. E. Schulz

RESEDACEAE

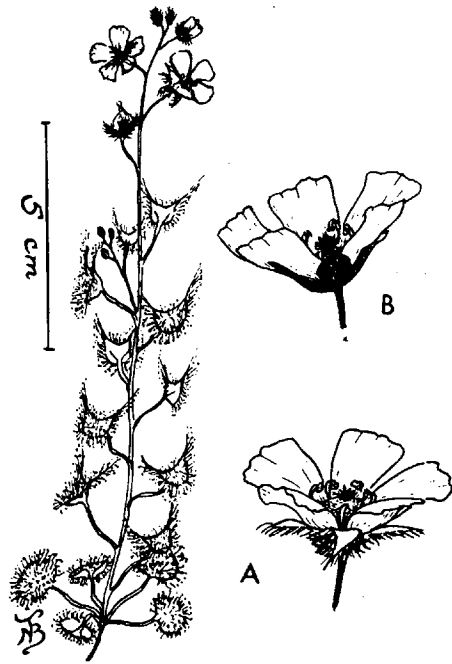
RESEDA L.

Tall glabrous perennial herb to 1.5 metres high; leaves mostly oblong-linear, lower to 20 cm. long, upper smaller, margin commonly undulate; flowers shortly pedicellate in spike-like racemes terminal to main stem and short upper laterals; sepals 4; petals greenish-yellow, deeply lobed, unequal with the upper pouched at base; stamens 20-30; carpels 3, shortly beaked; capsule inflated, subglobular to obovoid, 3-5 mm. long, 3 loculi opening above and transversely wrinkled. Common weed of disturbed ground in the A.C.T.; Europe and Asia and naturalised in southern and eastern Australia. 'Wild Mignonette'. Fig. 181.

**R. luteola* L.



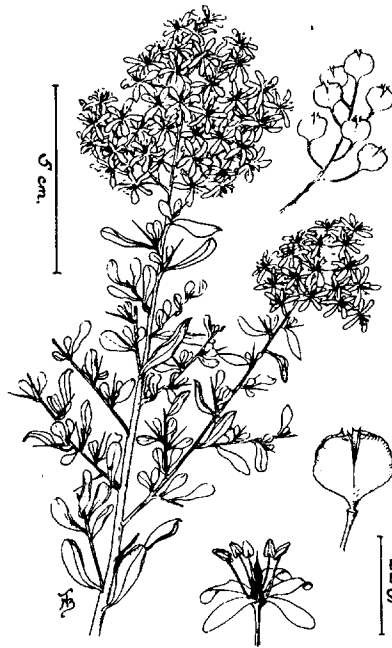
181. *Reseda luteola*



182. A. *Drosera peltata*
B. *Drosera auriculata*



183. *Crassula sieberana*



184. *Bursaria spinosa*

DROSERACEAE

DROSEREA L. See *Erickson (1968)*

1. Erect perennial herb from tuberous rootstock, stems often simple; *radical leaves often persistent until late flowering stage, semi-orbicular, 6-10 mm. broad on pedicel to 1 cm. long, less hairy than the semi-orbicular to lunate stem leaves with their glandular-ciliate angles; flowers in short terminal racemes; sepals dark and hirsute, ciliate on margins, 3-5 mm. long; petals white or drying to pink, longer than sepals; styles dichotomously branched.* Common in swampy hollows in grassland, woodland, and forest; Queensland to Tasmania, South Australia, and Western Australia. 'Sundew'. Fig. 182A.

1. **D. peltata** J. E. Sm. ex Willd.

1a. Similar to preceding but the *radical leaves soon withering; lower stem leaves commonly reduced to brown scales; sepals glabrous with irregularly toothed margins; style branches clavate and grouped in fan-shaped sections.* Similar habitats in dry sclerophyll forest; Queensland to Tasmania, South Australia; also New Zealand. 'Sundew'. Fig. 182B (flower).

2. **D. auriculata** Backh. ex Planch.

CRASSULACEAE

CRASSULA L.

1. Flowers in axillary clusters.

2. Small annual herb 3-8 cm. high; leaves opposite, 2-4 mm. long; flowers sessile, forming a leafy spike; *sepals 5, acuminate; petals 5, lanceolate acuminate, almost as long as sepals; carpels 5, papillose below, free and slightly longer than sepals in fruit, with slender apices.* In shallow soil under dry sclerophyll woodland and forest; southern Australia. 'Stonecrop'.

1. **C. colorata** (Nees) Ostenf.

2a. Similar to preceding but *sepals petals and carpels 4; sepals about twice as long as petals; fruiting carpels about as long as petals and shortly beaked.* More common than above with similar distribution; also Tasmania and New Zealand. 'Australian Stonecrop'. Fig. 183.

2. **C. sieberana** (Schult. et Schult. f.) Druce

1a. Flowers not in axillary clusters; sepals and petals 4.

3. Perennial herb to 20 cm. high, rooting in mud from the nodes; leaves often shorter than the internodes; *flowers solitary on filiform peduncles shorter than or as long as leaves; sepals 1.5-2 mm. long, petals white and slightly longer than sepals; carpels shortly beaked; seeds brown, smooth.* On margins of lakes, stagnant pools, and seepage areas; widespread in temperate Australia, Tasmania and New Zealand. 'Swamp Stonecrop'.

3. **C. helmsii** (Kirk) Cockayne

3a. Short annual herbs in dry habitats.

4. Very slender herb to 5 cm. high, stems red; leaves 2.5-3.5 mm. long; flowers 4-merous, solitary on axillary peduncles 2-4 times longer than the leaves; *sepals ovate, 0.5-0.75 mm. long; petals 2-3 times longer than sepals; carpels scarcely beaked; seeds brown with darker longitudinal markings and papillose at apex.* Easily overlooked but has been collected on Black Mountain; temperate Australia, Tasmania, and New Zealand. (Laundon (1961) considers this to be synonymous with the South American species **C. peduncularis** (J. E. Sm.) Meigen).

4. **C. purpurata** (J. D. Hook.)
Domin

4a. Herb to 8 cm. high; flowers on axillary peduncles or very short axillary shoots; peduncles usually longer than leaves; *sepals 1.5-2 mm. long, oblong; petals about as long as sepals;*

carpels beaked; *seeds evenly covered with minute white papillae*. Black Mountain; distributed over temperate areas of Australia and Tasmania. 'Rufous Stonecrop'.

5. *C. macrantha* (J. D. Hook.)
Diels et Pritzel

PITTOSPORACEAE

1. Fruit a dry flattened or inflated capsule.

2. Large shrub, branches often ending in spines; flowers numerous, in panicles.

1. **Bursaria**

2a. Small shrubs or semi-prostrate undershrubs, branches not spinose; flowers solitary.

2. **Marianthus**

1a. Fruit a fleshy or dry berry; plants twining, sometimes shrubby at base.

3. **Billardiera**

1. **BURSARIA** Cav.

Glabrous shrub to 4 metres high, smaller branchlets ending in spines; leaves oblanceolate, oblong or obovate, obtuse or retuse, paler beneath, 0.8-4 cm. long, often clustered at base of or axillary to spines; panicles terminal; sepals deciduous; petals white, oblanceolate, 4-8 mm. long, twice as long as sepals; stamens 5; capsule orbicular, brown, 2-celled, splitting into 4 valves above. Common in woodland and dry sclerophyll forests, flowering late summer (A.C.T.); all Australian States (except Northern Territory?). 'Australian Blackthorn'. Fig. 184.

B. spinosa Cav.

2. **MARIANTHUS** Huegel ex Endl.

1. Erect or *low undershrub to 40 cm. high; leaves narrow-cuneate to oblong-linear, 5-10 mm. long, sometimes toothed at apex, margins recurved or revolute, sparsely pubescent when young, crowded on younger shoots; flowers pedunculate, at first terminal but appearing lateral in fruit; peduncle pubescent or glabrescent; sepals narrow lanceolate acuminate, minutely ciliate towards base, at least $\frac{1}{2}$ as long as petals which are white or with purple apices, 3-5 mm. long, obtuse or acuminate; staminal filaments thickened below; ovary glabrous, obovate, somewhat flattened-inflated in fruit; seeds *deeply wrinkled*. In shallow soils in dry sclerophyll forests (A.C.T.); New South Wales to Tasmania.*

1. **M. procumbens** (W. J. Hook.)
Benth.

1a. Prostrate perennial herb with woody stems, forming small mats; leaves elliptical to obovate, 5-15 mm. long, margins thickened but translucent when young and minutely ciliate, apices acute-acuminate; flowers solitary, terminal, shortly pedunculate; sepals narrow linear-lanceolate, not more than $\frac{1}{2}$ as long as petals which are oblong, white, 6-7 mm. long, obtuse-apiculate; capsule flattened, almost orbicular; *testa minutely granular*. Among grass and other sward plants in alpine woodland at higher elevations. Fig. 185.

2. **M. sp.**

3. **BILLARDIERA** J. E. Sm.

1. Twining stems glabrous or pubescent when young; leaves lanceolate, elliptical or linear-oblong, 2-4 cm. long, *pale but glabrous beneath*; flowers on slender peduncles, solitary or in small clusters terminating short laterals; sepals lanceolate, 5-6 mm. long, minutely ciliate; *petals 2.5-3 cm. long, yellow or greenish-yellow, finally separating*; berry shortly oblong,

many-seeded, 1-2 cm. long, *glaucous or glossy, purple-blue when mature*. Sclerophyll forest; south-eastern New South Wales to Tasmania. 'Purple Appleberry'.

1. **B. longiflora** Labill.

1a. Twining stems villous-pubescent when young, glabrescent later; *leaves similar to those of preceding but villous-pubescent below and sparsely so above*; flowers terminating lateral branchlets; sepals 6-7 mm. long, sparsely hairy and ciliolate; *petals 1.5-2 cm. long, turning pinkish-purple within, soon free to base*; berry oblong or cylindroid, *glabrescent or pubescent, not turning purple*. Dry sclerophyll forest; also Queensland to Tasmania and South Australia. 'Hairy Appleberry'. Fig. 186.

2. **B. scandens** J. E. Sm.

ROSACEAE

1. Woody plants with thorny stems; flowers solitary or in cymes or panicles.

2. Seeds enclosed in a fleshy receptacle; stipules adnate to petiole.

1. **Rosa**

2a. Seeds in small clustered drupelets; stipules free.

2. **Rubus**

1a. Herbs without thorns; fruit dry.

3. Small annual herb; leaves lobed but broadly fan-shaped with large stipules; flowers in axillary clusters.

3. **Aphanes**

3a. Perennial herbs; leaves pinnate or pinnatisect; flowers in terminal inflorescences.

4. Flowers small and sessile in dense heads or on slender spikes; leaflets (at least all except basal ones) similar in size and regularly toothed.

5. Fruit with a pitted surface; without prickles or awns.

4. **Poterium**

5a. Fruit with prickles or awns.

5. **Acaena**

4a. Flowers 1 cm. or more in diameter, pedicellate in terminal panicle; leaves with a large terminal segment, leaflets irregularly toothed.

6. **Geum**

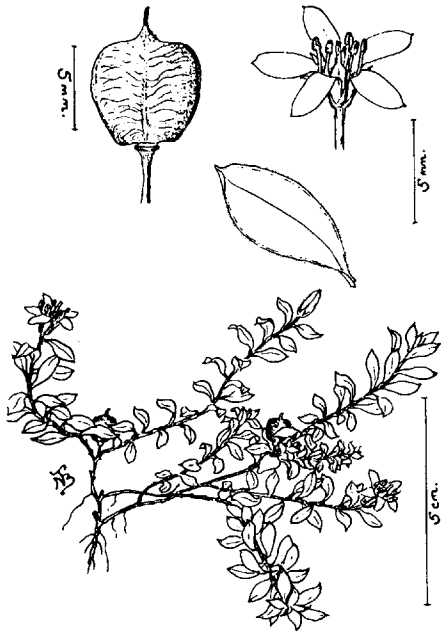
1. ROSA L.

Shrub to 1.5 metres high with many stems from base, stems and petioles with numerous curved thorns; stipules adnate to petiole; leaves pinnate with 5-9-serrate oval or obovate leaflets 8-15 mm. long (upper larger), softly hairy below, glandular hairs on petioles, margins, and undersurfaces; flowers 1-3 on short lateral shoots; sepals lanceolate with slender pinnately lobed apices, to 15 mm. long in flower, enlarged later but deciduous from fruit; petals pink, longer than sepals; stamens numerous; styles short, hairy; swollen receptacle (hip) red, ovoid, 1.5-2 cm. long. Common on roadsides and in adjacent areas especially near settlements; of European origin, naturalised in temperate Australia. 'Sweetbriar'. Fig. 187.

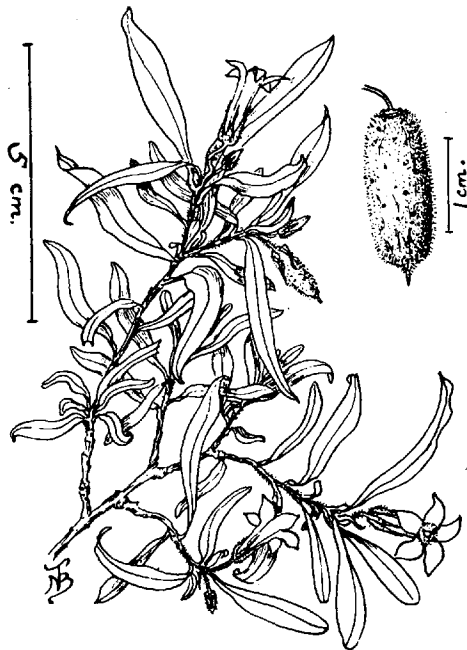
***R. rubiginosa** L.

2. RUBUS L.

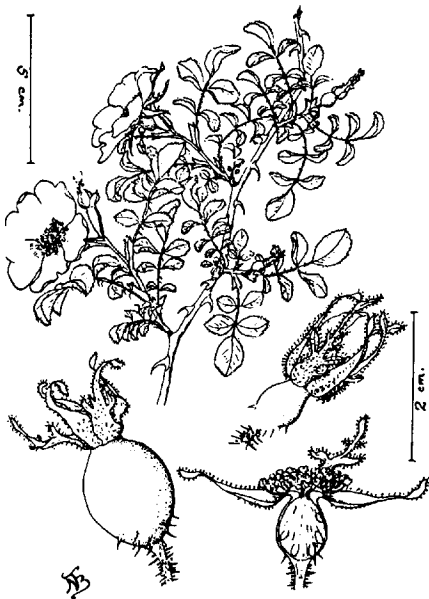
1. Large shrub with long arching or trailing thorned branches pubescent or tomentose when young; leaves pinnate with 3-5 irregularly serrate leaflets pubescent and paler beneath; terminal leaflet 4-7 cm. long, 3-4 cm. wide, petiole and midribs on undersurfaces with thorns, stipules narrow-linear; flowers in terminal panicles, *buds subglobose*; *sepals 6-9 mm. long, reflexed*; petals white or pinkish, longer than sepals; fruit an aggregate of purple-black



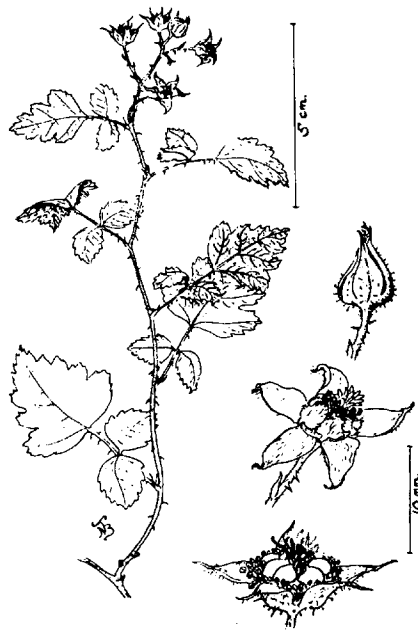
185. *Marianthus* sp.



186. *Billardiera scandens*



187. *Rosa rubiginosa*



188. *Rubus triphyllus*

glossy drupelets. In gullies and along creeks; of European origin but naturalised in suitable habitats throughout temperate Australia. 'Blackberry'.

1. **R. fruticosus* sens. lat.

1a. Smaller and more slender than preceding, not forming dense thickets; stems villous-tomentose when young, sparsely so later, thorns slender; leaflets with pectinate-serrate margins, sometimes rugose above with sunken veins; flowers in short cymes or panicles at or near ends of branches; *sepals long-acuminate, 8-10 mm. long, erect or spreading in fruit*; petals pink, drying darker, shorter than sepals; drupelets few, red. Widespread in tropical and temperate areas of the Old World, regarded as native in Australia; in forested gullies especially above 2000 ft (A.C.T.). 'Native Raspberry'. Fig. 188.

2. *R. triphyllus* Thunb.

Note: *R. roribaccus* Rydb. is naturalised in a small area on Black Mountain. It may be recognised by the trailing stems rooting towards the ends, flowers at the ends of short lateral shoots and fruit up to 4 cm. long. 'Dewberry'.

3. APHANES L. See Rothmaler (1955)

1. Small annual herb, usually erect and up to 10 cm. high, clothed with bristly hairs; leaves shortly petiolate, fan-shaped, deeply lobed, 3-12 mm. long; stipules of lower leaves membranous, of upper green and lobed, cupular around stem, hispid, ciliate; flowers 4- or 5-merous, green but later reddish, in axillary clusters within the stipules, short pedicel hairy; achene obliquely attached, compressed ovoid, less than 1 mm. long; enclosed in *persistent striate calyx 1.5-1.75 mm. long which is not much constricted below lanceolate lobes forming $\frac{1}{3}$ total length, sparsely hispid on middle of body and ciliate on lobes*. In damp sites in dry sclerophyll habitats. (Since plants may bear both 4- and 5-merous flowers *A. pentamera* Rothm. is regarded as conspecific.) Fig. 189A.

1. *A. australiana* (Rothm.) Rothm.

1a. Decumbent or erect herb similar to preceding; cupular stipules less obscurely nervate and with bristly hairs along veins; achene 1.25-1.5 mm. long; *persistent calyx 2.5 mm. long, striate and constricted below triangular lobes 0.5 mm. long; with spreading hairs on body and longer bristles on striations up to and into ciliate lobes*. In disturbed or waste ground; of European origin now naturalised in temperate Australia. 'Parsley Piert'. Fig. 189B.

2. **A. arvensis* L.

4. POTERIUM L.

Tufted perennial herb; leaves mostly radical, pinnate with 9-12 irregularly arranged shortly petiolulate ovate-oblong or orbicular leaflets with serrate margins, terminal leaflet not much larger; flowers in a long-peduncled head, upper flowers female, lower male; fruit dry, sharply quadrangular, 3-4 mm. long, deeply wrinkled or muricate between angles. Naturalised in vicinity of Canberra, and some other areas of temperate Australia; native to Europe and Asia. 'Sheep's Burnet'. Fig. 190.

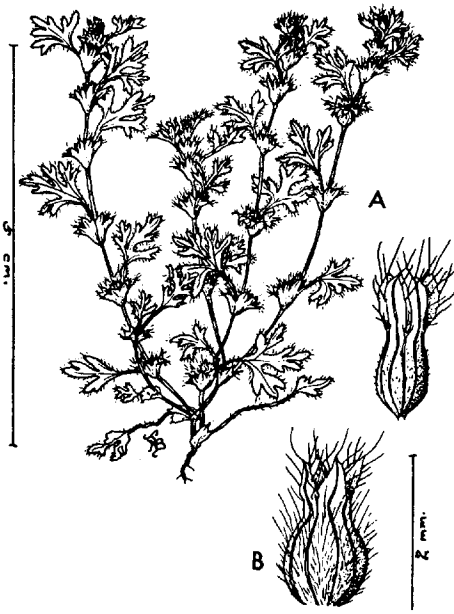
**P. polygamum* Waldst. et Kit.

5. ACAENA Mutis ex L.

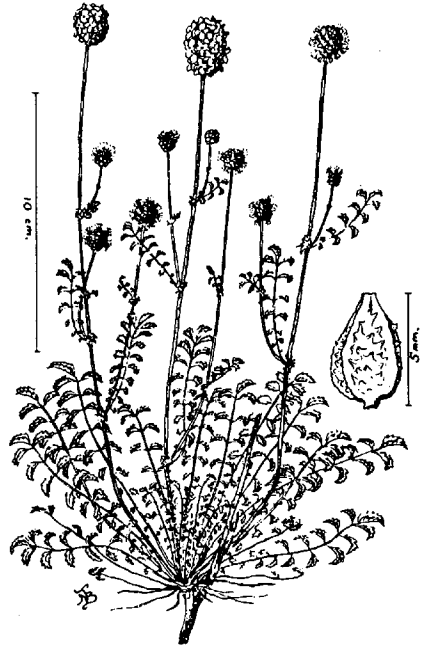
1. Villous perennial herb with few seasonal stems; *leaves pinnate with 15-21 oblong leaflets 8-15 mm. long and regularly but obtusely lobed; flowers in slender spikes much elongated in fruiting stage; fruit ovoid, angular, pubescent, the spiny bristles unequal in length but with apical tuft of reflexed hairs*. Common weedy species of grazed areas or adjacent dry sclerophyll habitats; temperate and eastern Australia. 'Sheep's Burr'. Fig. 191.

1. *A. ovina* A. Cunn.

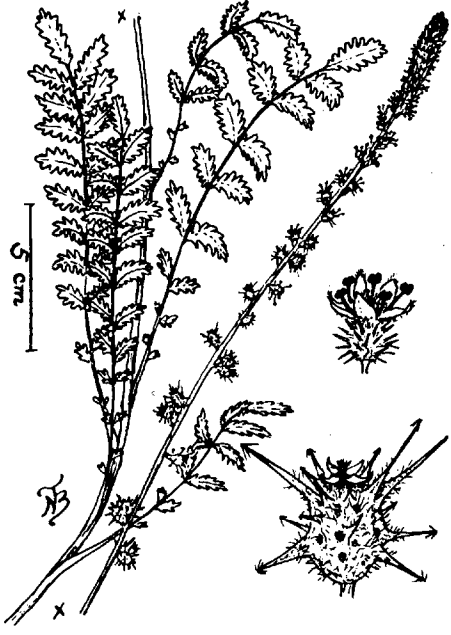
1a. Procumbent perennial herb forming mats in damp cool shady places; leaves with 7-11 deeply toothed leaflets which are sparsely hairy above and silky with appressed hairs below;



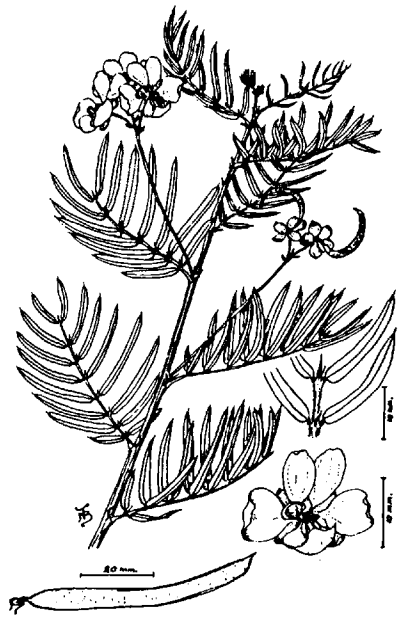
189. A. *Aphanes australiana*
 B. *Aphanes arvensis*



190. *Poterium polygamum*



191. *Acaena ovina*



199. *Cassia aciphylla*

flowers in dense globular heads on slender peduncles erect above leaves; fruit ovoid-turbinate, 4-ribbed with 4 divergent spines each with apical tuft of reflexed hairs. Common in mountain gullies and at high elevations, usually near water; eastern Australia and Tasmania, also New Guinea and New Zealand. 'Bidgee-Widgee', 'Biddy Biddy'.

2. *A. anserinifolia* (J. R. et G. Forst.) Druce

6. GEUM L.

Perennial hirsute herb with radical long-petioled irregularly pinnate leaves, lobes irregularly toothed, terminal lobe large; upper stem leaves reduced to terminal lobe on short petiole; stipules ovate, lobed; flowers terminal or from upper axils in a terminal panicle; sepals 5, pubescent, united below with narrow lobes of an epicalyx placed high on tube; petals yellow, 4.5-5.5 mm. long; stamens and carpels numerous, later reflexed; stigma slender, hairy below near attachment to hooked apex of style from which it is deciduous; fruit with stiff bristles and terminal hooked spine (persistent style). Generally regarded as an introduced form of a European species; New South Wales to Tasmania, also New Zealand; uncommon in the A.C.T. where it has been collected in Upper Cotter Valley near old homestead. 'Avens'.

G. urbanum L. var. *strictum*
(Soland.) J. D. Hook.

MIMOSACEAE

ACACIA Mill.

1. Leaves reduced to leaflike phyllodes or spines.
2. Flowers arranged in globular or subglobular heads.
3. Phyllodes terete or vertically flattened with pungent points.
4. Low rigid or prostrate undershrub to 50 cm. high; branchlets striate, woolly tomentose at least when young; phyllodes 3-6 cm. long, 3-5 mm. broad, lanceolate or narrow elliptical, often slightly curved, woolly pubescent along the 3-5 parallel nerves, apices acute or acuminate, pungent or subpungent; heads paired or clustered in axils, shortly pedunculate, globular to shortly oblong with up to 30 5-merous flowers; calyx broadly campanulate, pubescent, ciliate on the short lobes, less than $\frac{1}{2}$ as long as glabrous petals; pod 8-12 cm. long, 5-6 mm. wide, curved and slightly constricted between seeds, woolly pubescent. In dry sclerophyll forest areas (A.C.T.); south-eastern Queensland to Victoria including the Dividing Range in New South Wales. 'Hairy Wattle'. Fig. 192A.

1. *A. lanigera* A. Cunn.

4a. Phyllodes 1-nerved.

5. Rigid shrub to 2.5 metres high, branchlets striate and glabrous; phyllodes 1.5-3.5 cm. long, 1-2 mm. wide, subulate-terete when fresh, angular-flattened when dry; heads paired or in 3s, \pm 20-flowered, axillary on slender peduncles shorter than leaves and with small ovate bracts at base; flowers 4-merous, pale yellow, calyx tubular to middle, thick glabrous lobes, less than $\frac{1}{2}$ as long as petals; pods 8-12 cm. long, 5-7 mm. wide, thick when fresh. Common in dry sclerophyll forest below 3000 ft; flowering early in winter; also in New South Wales, Victoria, and Tasmania. 'Early Wattle'. Fig. 193D.

2. *A. diffusa* Lindl.

5a. Phyllodes flattened, flowers 5-merous.

6. Phyllodes linear or elliptical, 1.5-3.5 cm. long.
7. Rigid glabrous shrub or small tree, branches terete; phyllodes coriaceous, gland present in lower part of upper margins or absent; heads sessile or subsessile, axillary, about 30-



192. A. *Acacia lanigera*
B. *Acacia dawsonii*
C. *Acacia buxifolia*

JB

flowered; sepals spatulate, ciliate, $\frac{1}{2}$ as long as petals; *pod straight, 1.5-2.5 cm. long, 5-7 mm. wide*; seeds transverse or oblique, funicle filiform. Common in mountain swamps and along creeks in mountain gullies; also New South Wales, Victoria, and Tasmania. 'Creek Wattle'. Fig. 193B.

3. *A. siculiformis* A. Cunn. ex Benth.

7a. Intricately branched shrub to 2 metres high; stems terete and minutely pubescent when young; phyllodes glabrous, rigid and spreading, acicular, angular-striate, apices pungent; heads axillary often solitary, *peduncle slender and glabrous*; flowers more than 20 per head; sepals linear-spatulate, half as long as petals; *pod 2.5-4 cm. long, 3-4 mm. wide*, brown between pale sutures. In dry sclerophyll habitats but uncommon in the A.C.T.; distributed from Queensland to Victoria. 'Juniper Wattle'. Fig. 193F.

4. *A. ulicifolia* (Salisb.) Court

6a. Small shrub, sometimes almost procumbent, pubescent or glabrous; *phyllodes pubescent, the upper angle (often with gland) prominent giving triangular shape even when falcate, 6-12 mm. long*, nerve near lower margin; stipules subulate, brown, pubescent, often persistent; heads solitary or paired in axils, peduncles minutely pubescent, flowers more than 20; calyx thin and splitting into oblanceolate or spatulate hairy-ciliate sepals about $\frac{1}{2}$ as long as petals; *pod 3-4 cm. long, 5-6 mm. wide*, pubescent or glabrescent, slightly constricted between seeds. On shallow soil in forest at higher elevations; also New South Wales, Victoria, South Australia, and Tasmania. 'Ploughshare Wattle', 'Dog's Tooth Wattle'. Fig. 193C.

5. *A. vomeriformis* A. Cunn. ex Benth.

3a. Phyllodes vertically flattened, sometimes mucronate but not pungent pointed.

8. Phyllodes 1-nerved or with 1 lesser nerve as well as the main one.

9. Flowerheads solitary, paired or clustered in the axils.

10. Bushy shrub to 3 metres high, *branchlets hirsute-pubescent, striate; stipules spinescent, rigid and spreading*; phyllodes obliquely-oblong or asymmetrically ovate, hirsute or glabrescent except along nerves, 1-3 cm. long, 3-7 mm. wide, undulate, surface minutely puncticulate, apex with soft or stiff mucro; peduncles almost as long as phyllodes, flowers numerous; calyx thin, lobed, about $\frac{1}{2}$ as long as petals; *pod straight, 5-6 cm. long, 4-5 mm. wide*, villous or hispid. Temperate Australia but uncommon in the A.C.T., e.g. lower slopes of Mt Ainslie and possibly not native to area, introduced in Tasmania. 'Kangaroo Thorn'. Fig. 193A.

6. *A. armata* R.Br.

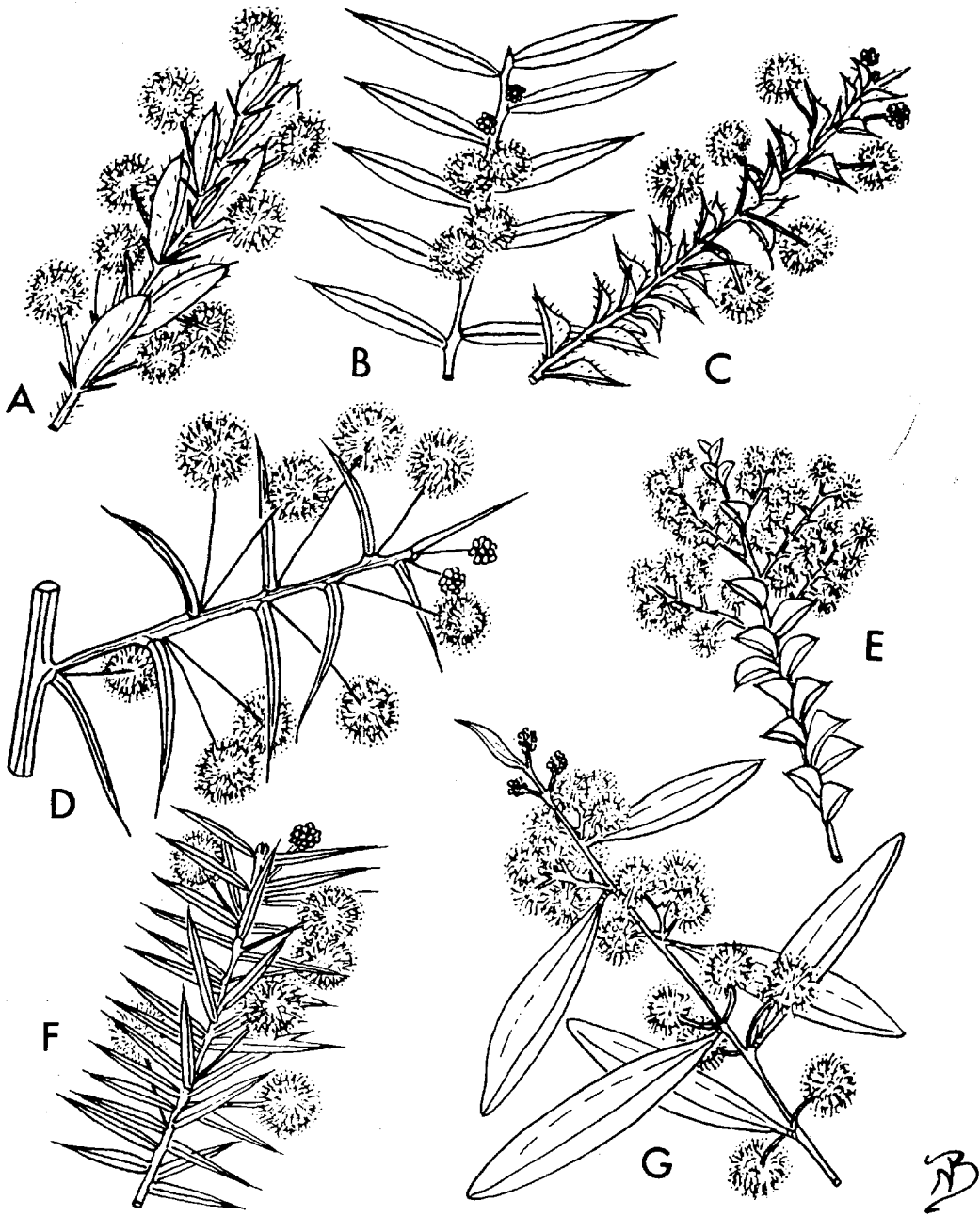
10a. Diffuse slender shrub or small tree, *branches and phyllodes resinous but glabrous*; stipules deciduous; phyllodes linear-elliptical to broadly elliptical, 4-12 cm. long, 3-15 mm. wide with 2 longitudinal nerves and nerve-like margins, surface puncticulate, acuminate apex sometimes hooked; heads on pubescent peduncles 4- mm. long; flowers numerous; calyx shortly lobed, about $\frac{1}{2}$ as long as pubescent or glabrous petals; *pod resinous, stipitate, margins thickened, surface reticulate, 7-10 cm. long, 5-6 mm. wide*, straight or slightly constricted between seeds. Not common in the A.C.T. except in Gibraltar Creek Valley and in few places in Cotter Valley; also New South Wales, Victoria, Tasmania, and South Australia. 'Varnish Wattle'. Fig. 193G.

7. *A. verniciflua* A. Cunn.

9a. Flowers in axillary racemes.

11. Racemes longer than the phyllodes.

12. Shrub or small tree, branches and phyllodes glabrous; branchlets angular-striate; *phyllodes asymmetrically triangular, main nerve near lower margin, lesser nerve above it*,



193. A. *Acacia armata*
 B. *Acacia siculiformis*
 C. *Acacia vomeriformis*
 D. *Acacia diffusa*
 E. *Acacia pravissima*
 F. *Acacia ulicifolia*
 G. *Acacia verniciflua*

7-10 mm. long and almost as wide, upper angle rounded and with conspicuous gland between it and base; heads few-flowered; calyx shortly lobed, pubescent or glabrescent, less than $\frac{1}{2}$ as long as petals; pod 3-5 cm. long, 5-6 mm. wide, straight flat and glabrous, seeds longitudinal, funicle swollen and slightly folded. Common on banks of rivers and in forest at higher elevations; also New South Wales and eastern Victoria. 'Wedge-leaf Wattle'. Fig. 193E.

8. *A. pravissima* F. Muell.

12a. Shrub 1-3 metres high with glabrous angular branchlets; *phyllodes elliptical to narrow-obovate*, 1.5-3 cm. long, 4-8 mm. wide, 1-nerved, slightly glaucous, apex acute or obtuse and sometimes apiculate; heads with 8-15 flowers; calyx very short; petals glabrous; pod 6-10 cm. long, 7-9 mm. wide; stipitate, slightly glaucous, valves convex over alternate seeds and slightly constricted between them; funicle thickened into a short aril. Common in sclerophyll woodland and dry forest below 2500 ft; also south-eastern Queensland, New South Wales, and eastern Victoria. 'Boxleaf Wattle'. Fig. 192C.

9. *A. buxifolia* A. Cunn.

11a. Racemes shorter than phyllodes.

13. Shrub or small tree, branchlets striate and minutely pubescent; *phyllodes linear, striate with one or two nerves prominent*, 5-10 cm. long, 3-5 mm. wide, small gland present near base, apex obtuse-apiculate; *flowers in groups of 4-6 spicate on short rhachis*; calyx pubescent, lobed to middle, about $\frac{1}{2}$ as long as glabrous petals; pod shortly stipitate, linear but slightly constricted between seeds, 3-6 cm. long, 2-3 mm. wide. Common on poor soils to north-east of Canberra, e.g. Kowen area; south-eastern New South Wales. 'Poverty Wattle'. Fig. 192B.

10. *A. dawsonii* R. T. Baker

13a. Phyllodes 1-nerved, lateral nerves obscure or reticulate.

14. Shrub to 4 metres high with glabrous or subglabrous angular striate branchlets which turn red when dry; *bipinnate juvenile foliage often persistent* even on flowering branches; phyllodes elliptical to oblanceolate, straight or falcate, 8-20 cm. long, 8-15 mm. wide, acuminate or acute, with conspicuous gland in lower half of upper margin and sometimes a second in the upper third, *margins and midrib turning red on drying*; *heads 10-15-flowered*; calyx with broad lobes or splitting into linear-spathulate sepals $\frac{1}{2}$ as long as petals which are glabrous with evident midrib; pod straight, 10-12 cm. long, 7-9 mm. wide, slightly glaucous; funicle in double fold around seed. Common along creeks and rivers and in gullies of the lower slopes; also Tablelands of New South Wales, north-eastern Victoria. 'Redleaf Wattle'. Fig. 194B.

11. *A. rubida* A. Cunn.

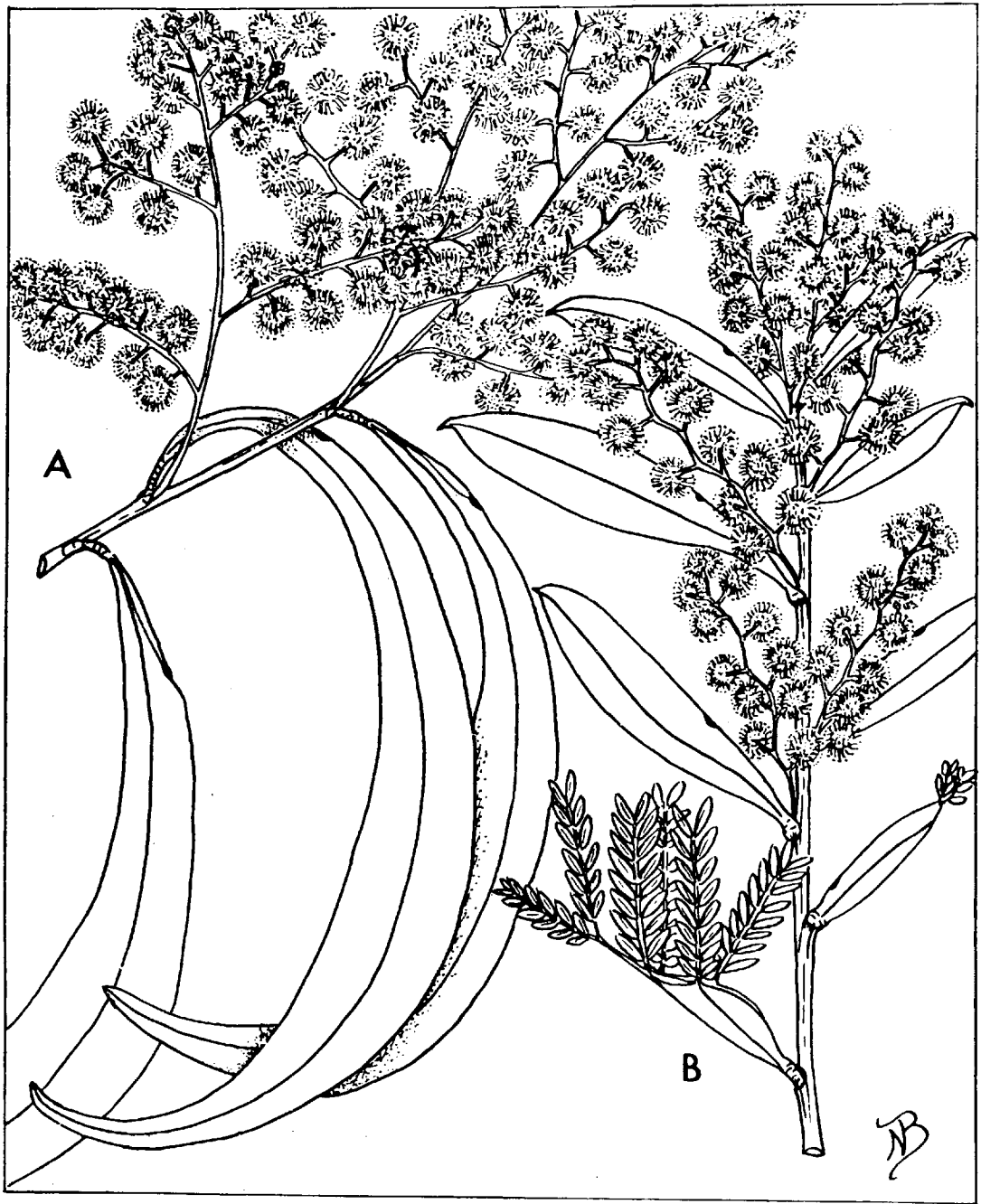
14a. *Bipinnate juvenile foliage not persistent* on adult or flowering branches; flowers more than 12 and usually more than 20 per head.

15. Large shrub or small tree to 5 metres high, bark of upper trunk and main limbs often pale and glaucous, phyllodes 8-18 cm. long, 2-5 cm. wide, variable from lanceolate-falcate to broadly oblanceolate and obtuse; margins nerve-like, racemes 8-15 cm. long, *rhachis robust, often flexuose, heads with 40-80 flowers*, calyx more than $\frac{1}{2}$ as long as petals, lobes ciliate; *pod linear, 8-10 cm. long, 6-8 mm. wide*; funicle short. Woodland areas below 2500 ft, eastern slopes Mt Ainslie and Mt Jerrabomberra near Queanbeyan; also Queensland to Tasmania and South Australia. 'Golden Wattle'. Fig. 195A.

12. *A. pycnantha* Benth.

15a. Heads with 15-30 flowers; pod more than 1 cm. wide.

16. Large shrub or small tree, bark usually smooth and grey; branchlets commonly glaucous; phyllodes from narrowly to broadly oblanceolate, obtuse, scarcely falcate though often curved towards base, *broader on one side of midrib than on the other*, 5-15 cm. long, 1-4.5 cm.



194. A. *Acacia falciiformis*
B. *Acacia rubida*

wide, with *gland at or slightly above base* but without oblique nerve to petiole; *racemes flexuose, glabrous, angular-flattened* (when dry); heads with 20-24 flowers, calyx about $\frac{1}{2}$ as long as petals, lobes ciliate, petals pubescent in lower half, midrib prominent above; pod stipitate, 4-15 cm. long, 1.5-2.5 cm. wide, straight, sides bluish-brown or glaucous and much wider than seeds; funicle with small loop near attachment to pod, aril obliquely swollen. At high elevations especially above 4000 ft in shrubby alpine woodland; also Central and Southern Tablelands of New South Wales and from East Gippsland to Grampians in Victoria.

13. *A. obliquinervia* Tindale

16a. Rhachis of racemes not flexuose, slender; phyllodes not (or only on few leaves) unequally sided, with the marginal gland (when distant from the base) linked to the petiole by a decurrent vein.

17. Large shrub or tree (rarely as much as 30-40 ft (10-12 metres) high in the A.C.T.), suckering strongly from roots after fire or disturbance and then forming thickets; bark thick and rough, dark coloured; *phyllodes commonly falcate, 10-25 cm. long*; racemes simple in upper axils or in terminal panicles, *rhachis pubescent with golden hairs*, which are also present on peduncles, calyces, and petals; flowers about 20 per head; calyx less than $\frac{1}{2}$ as long as petals; petals without prominent midrib; pod stipitate, glaucous or pale brown, 8-20 cm. long, 2-2.5 cm. wide, *often constricted between the seeds*; funicle similar to that of preceding. Common in dry sclerophyll forest between 2500 and 3500 ft, especially after fires or disturbance such as clearing or road making; also south-eastern Queensland, Coast and Tablelands of New South Wales, eastern and southern Victoria. The bark may be torn into strips by cockatoos seeking large grubs in the trunk. 'Broad-leaved Hickory'. Fig. 194A.

14. *A. falciformis* DC.

17a. Shrubs often less than 1 metre high (in local plants—elsewhere may develop into medium sized tree); phyllodes obovate and obtuse, on local plants 4-10 cm. long and more or less straight; racemes mostly axillary, *rhachis glabrous*; sometimes reduced to few heads of about 20 flowers each; calyx less than $\frac{1}{2}$ as long as petals, lobes ciliate, petals with prominent midribs; pod light brown, 7-15 cm. long, 1.3-1.5 cm. wide, sometimes slightly constricted between seeds; funicle as in preceding. Uncommon in the A.C.T. (slopes of Mt Jerrabomberra and Black Mountain), on shallow stony soils under dry sclerophyll forest or woodland; Queensland to Tablelands and Western Slopes of New South Wales.

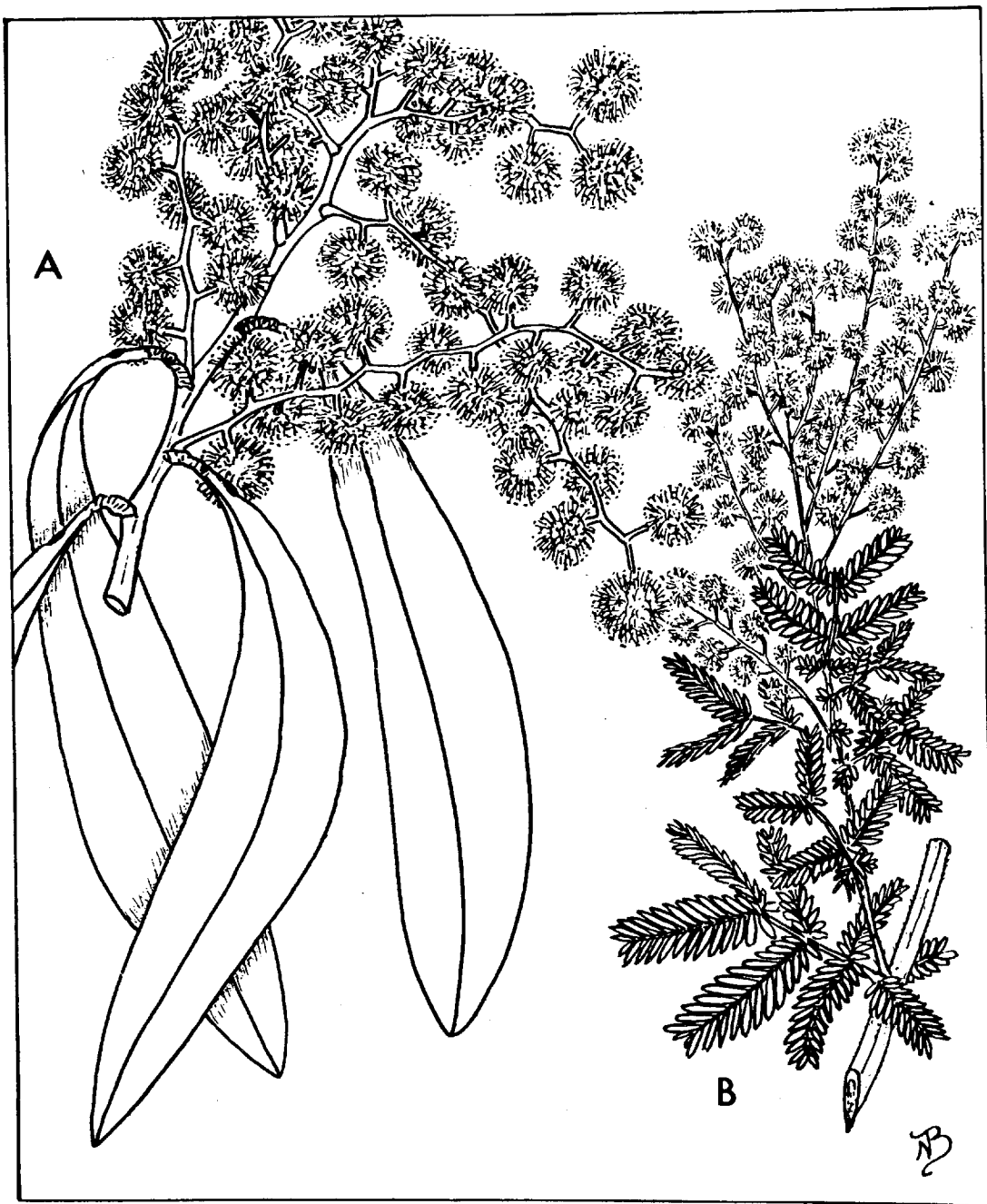
15. *A. penninervis* Sieb. ex DC.

8a. Phyllodes with several longitudinal nerves; heads in short axillary racemes, or racemes paniculate but short.

18. Tree or shrub with dense foliage, branchlets angular, minutely hoary when young; *phyllodes with 3-7 longitudinal nerves with a fine reticulation of minor veinlets between, 7-12 cm. long, 1-1.5 cm. wide, lanceolate-elliptical to oblong, obtuse*; heads pale yellow, with more than 30 flowers; calyx truncate, ciliate, more than $\frac{1}{2}$ as long as striate petals; pod curved or coiled, margins nerve-like, valves reticulately marked, 5-15 cm. long, 5-8 mm. wide; *seeds encircled by double fold of bright red funicle*. Common species of gullies and cool slopes from 2000 ft to higher elevations; flowering in spring; also distributed south-eastern Queensland, eastern New South Wales to Tasmania and south-east of South Australia. 'Blackwood'. Fig. 196B.

16. *A. melanoxyton* R.Br.

18a. Bushy-topped small tree or shrub; *phyllodes similar to those of A. melanoxyton but more often falcate and the veinlets not reticulate but anastomising*; heads in paniculate racemes, flowers pale yellow; *calyx lobed and angular, sparsely hairy above, less than $\frac{1}{2}$ as long as smooth petals*; *pod long and narrow, falcate or loosely coiled, nerve-like margins conspicuous*,



195. A. *Acacia pycnantha*
B. *Acacia baileyana*

15-25 cm. long, 5-6 mm. wide; seeds with *white funicle in few folds at one end*; flowering late summer. In shallow soils under or near dry sclerophyll forest or woodland; also south-eastern Queensland, eastern New South Wales. 'Hickory'. Fig. 196A.

17. *A. implexa* Benth.

2a. Flowers in spikes; phyllodes narrow linear and more than 6 cm. long.

19. *Spikes composed of small clusters of 4-6 flowers* sparsely grouped on short axis; phyllodes dull-surfaced (see also p. 200).

10. *A. dawsonii* R. T. Baker

19a. Shrub or small tree with glabrous branchlets; young shoots slightly resinous; *phyllodes glossy when fresh*, linear, nerves longitudinal with 1 or 2 more prominent, 7-20 cm. long, 3-7 mm. wide; *flowers in dense pedunculate axillary spikes*; calyx truncate, hairy, about $\frac{1}{2}$ as long as petals which have prominent midribs; pod narrow linear, 7-10 cm. long, 2-3 mm. wide, slightly constricted between longitudinal seeds, funicle forming white cap over end of seed. More common and widely distributed in drier areas of inland Australia; occurs locally in the Molonglo Gorge. 'Currawang', 'Caariwan'. Fig. 196C.

18. *A. doratoxylon* A. Cunn.

1a. Leaves bipinnate.

20. Leaves with more than 6 pairs of pinnae.

21. Slender shrubs or small trees, *branchlets and leaves silvery-grey and hoary-pubescent*; leaves with 10-20 pairs of pinnae each with numerous narrow-linear pinnules 2-5 mm. long; racemes paniculate, terminal or in upper axils; heads globular, pedicellate, 20-30-flowered; calyx lobed, ciliate, petals with prominent midrib; pods glaucous, 6-10 cm. long, 7-9 mm. wide, not constricted between seeds. Common in gullies and on mountain slopes from 2000 to 5000 ft; also New South Wales (especially southern areas), Queensland to Tasmania. An unnamed form at higher elevations in wet sclerophyll forest has smaller leaves and fewer heads in shorter racemes. 'Silver Wattle'. Fig. 197A.

19. *A. dealbata* Link

21a. Foliage green.

22. Large shrub or small tree to 6 metres high, *branchlets with winglike ridges*, foliage glabrous; leaves with 6-15 pairs of pinnae each with numerous narrow linear *pinnules 8-10 mm. long* set slightly apart; racemes simple or paniculate in upper axils or terminal; calyx truncate, ciliate; petals with prominent midrib; pod straight, glabrescent, slightly constricted between seeds. Eastern Australia and Tasmania; adventive near Canberra and other parts of the A.C.T. Hybrids between this and *A. baileyana* are fairly common in planted areas around the city. The hybrids appear to be more susceptible to insect galls than either parent species. 'Black Wattle'. Fig. 197B.

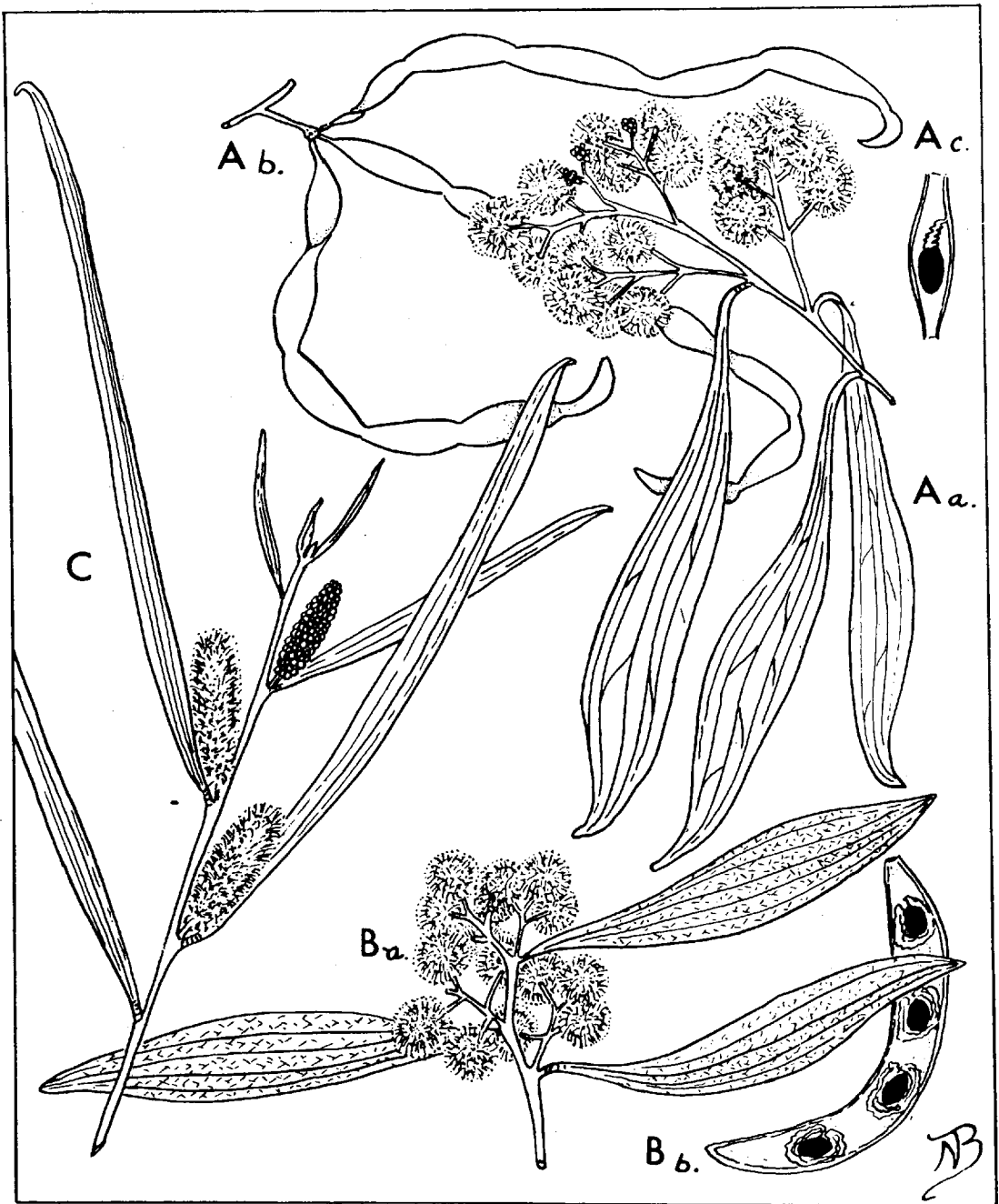
20. *A. decurrens* (Wendl.) Willd.

22a. Branches not angular, obscurely ribbed; pinnules less than 7 mm. long.

23. Tree to 6 metres high, bark smooth; *branchlets, leaves and racemes minutely and softly pubescent with pale hairs*; petiole bare at base but with conspicuous glands between the 8-16 pairs of pinnae; *pinnules numerous, set close together*, obliquely oblong, 1.5-2.5 mm. long; racemes paniculate, axillary or terminal; *calyx hairy*, less than $\frac{1}{2}$ as long as glabrous petals; *pod pubescent*, often constricted between seeds, 10-15 cm. long, 7-9 mm. wide, grows on slopes of Black Mountain, also near Lake George (N.S.W.); New South Wales, Victoria, Tasmania, south-eastern South Australia and planted in other areas. 'Green Wattle'. Fig. 198A.

21. *A. mearnsii* De Wild.

23a. Trees similar to above, *young shoots with golden hairs*, later glabrescent; leaves with



196. A. *Acacia implexa*
 B. *Acacia melanoxylon*
 C. *Acacia doratoxylon*

6-8 pairs of pinnae, petiole with conspicuous glands, *pinnules numerous, set close together, 4-6 mm. long, oblong-linear*; racemes paniculate but shorter than subtending leaves; heads pale yellow, about 20-flowered; *calyx shortly lobed or split into linear-oblong hairy ciliate sepals about 1/2 as long as glabrous petals*; *pod 4-8 cm. long, 4-6 mm. wide, glabrescent, constricted between seeds with funicles expanded into oblique arils*. Margins of dry sclerophyll forest below 2000 ft, e.g. vicinity of Canberra and near Hall. Fig. 198B.

22. *A. parramattensis* Tindale

20a. Large bushy shrub or small tree, *foliage silvery-grey and minutely pubescent*; leaves stiffly spreading with 3-4 pairs of pinnae 2-3.5 cm. long, the lowest pair shorter and embracing the stem; pinnules 5-7 mm. long; racemes slender in terminal panicles, with numerous heads of 16-20 flowers; calyx shortly lobed; pod 6-9 cm. long, 1-1.5 cm. wide, not constricted between seeds. Native occurrence near Cootamundra, New South Wales, but widely grown throughout temperate Australia, adventive in and around Canberra from street and garden plantings. (See note on hybrids under *A. decurrens*.) 'Cootamundra Wattle'. Fig. 195B.

23. *A. baileyana* F. Muell.

CAESALPINIACEAE

CASSIA L. See Symon (1966)

Shrub to 1.5 metres high, sparsely pubescent, stems angular-striate; leaves alternate, pinnate with 6-8 pairs of linear-oblong leaflets and usually with a stipitate gland on rhachis between opposing leaflets which are 1.5-2.5 cm. long, margins recurved or revolute, apices obtuse-apiculate; stipules linear-subulate, deciduous; umbels few-flowered, axillary, peduncles shorter than or as long as subtending leaf, pedicels about as long as flower; sepals 5, broadly oblong, obtuse, 4-5 mm. long, outer ones ciliate; petals orange-yellow, glabrous, more than twice as long as sepals; stamens 10, filaments very short, anthers opening by apical pores but 2-3 of them longer and to 5 mm. long; ovary curved, hairy; pod flat, to 10 cm. long, 1.5 cm. wide. Ginninderra Gorge north-west of the A.C.T. border; south-eastern Queensland to eastern Victoria. (One of the taxa formerly included in *C. australis* sens. lat.) 'Australian Senna'. Fig. 199.

C. aciphylla Benth.

PAPILIONACEAE (FABACEAE)

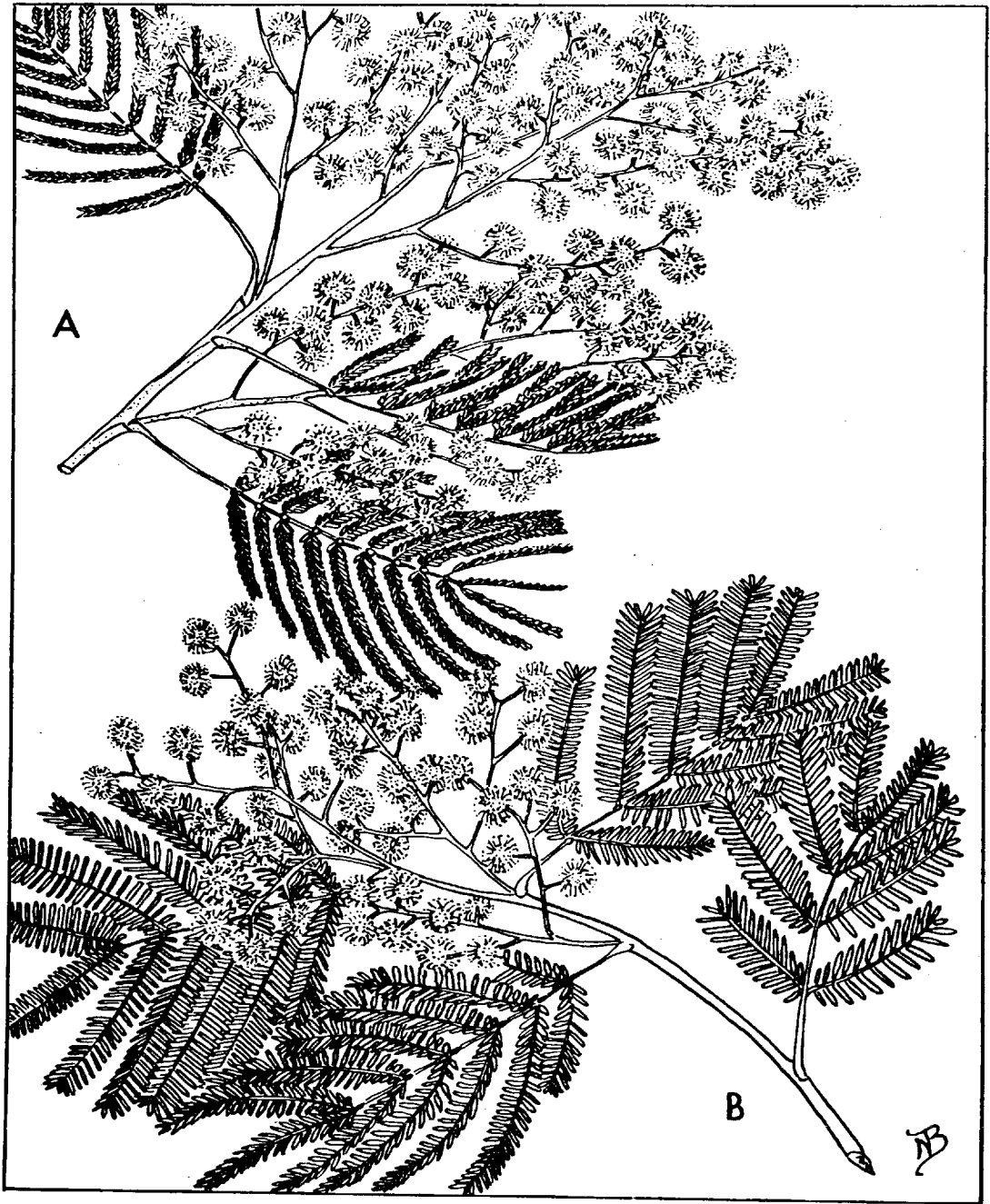
Note: In the following key no attempt is made to arrange genera according to tribes or special affinities.

1. Leaves simple, unifoliate (i.e. with a shortly petiolulate leaflet on summit of petiole) or without leaves.
 2. Flowers yellow, orange, or reddish-brown.
 3. Flowers without a pair of small bracteoles or with a pair on the pedicel.
 4. Stamens all free.
 5. Pod glabrous, triangular.
 1. *Daviesia* (p. 210)
 - 5a. Pod hairy or villous, ovoid or ellipsoid.
 6. Leaves angular-terete or the margins incurved so that leaf is channelled above.
 2. *Dillwynia* (p. 212)
 - 6a. Leaves flat or with margin recurved or revolute so that leaf is channelled below.
 7. Ovules 4 or more; pod with a longitudinal partition due to infolding of lower suture; flowers clustered in upper axils.
 3. *Mirbelia* (p. 213)
 - 7a. Pod without longitudinal partition; ovules 4; bracteoles present but soon deciduous; flowers in racemes terminal to shoots in upper axils.
 4. *Oxylobium* (p. 213)



197. A. *Acacia dealbata*
B. *Acacia decurrens*

- 4a. Stamens united in a tube or in a sheath open above and with one free stamen.
8. Pod winged on upper margin, valves curved or rolled back on opening; leaves conspicuously reticulate-veined.
5. **Platylobium** (p. 213)
- 8a. Pod not winged on upper margin, valves flat when open or almost so; leaves without conspicuous reticulate veins.
6. **Bossiaea** (p. 214)
- 3a. Bracteoles attached to calyx tube and persistent; stipules present.
7. **Pultenaea** (p. 216)
- 2a. Flowers purple or mauve.
9. Leaves simple; flowers clustered in the axils; shrubs or subshrubs.
8. **Hovea** (p. 218)
- 9a. Leaves unifoliate; flowers in nodding racemes; trailing or twining plants.
9. **Hardenbergia** (p. 220)
- 1a. Leaves compound.
10. Leaves trifoliate; stipules adnate to petiole. Mostly introduced species.
11. Pod enclosed in calyx; leaves usually digitately trifoliate; herbs.
10. **Trifolium** (p. 220)
- 11a. Pod longer than calyx.
12. Leaves usually pinnately trifoliate; flowers less than 1 cm. long or, if more, not golden-yellow; plants herbaceous.
13. Pod ovoid; flowers in slender racemes.
11. **Melilotus** (p. 222)
- 13a. Pod curved or coiled (more or less reniform in **Medicago lupulina**).
14. Flowers in headlike racemes; pod coiled or curved spirally.
12. **Medicago** (p. 223)
- 14a. Flowers in small clusters; pod curved up at end; plants curry-scented or fragrant.
13. **Trigonella** (p. 224)
- 12a. Plants shrubby, leaves digitately trifoliate; flowers golden-yellow, 1 cm. long, in short racemes terminal to short lateral shoots.
14. **Teline** (p. 224)
- 10a. Herbs or shrubs with pinnate leaves or, if trifoliate, the stipules not adnate to petiole.
15. Weak herbs with pinnate leaves (leaflets sometimes reduced to single pair) with upper part modified into simple or pinnate tendrils. Introduced species.
16. Stems terete or sub-tetragonous; style slender and bearded at apex; wing petals adherent to keel.
15. **Vicia** (p. 224)
- 16a. Stems winged or markedly angular; style flattened in upper part and bearded on inner face only; wing petals free from keel or almost so.
16. **Lathyrus** (p. 226)
- 15a. Leaves without tendrils; shrubs, subshrubs, or wiry herbs.
17. Leaves pinnate with lowest pair of leaflets set close to stem.
17. **Lotus** (p. 226)
- 17a. Leaves with the lowest pair of leaflets not set close against stem (even when petiole is short) or digitate.
18. Plants with numerous dark glands on stems, leaves, and calyces; leaves with long petioles, digitate with 3 or 5 leaflets; pod 1-seeded and indehiscent.
18. **Psoralea** (p. 228)
- 18a. Plants without numerous glands; pods with more than 1 seed (except **Lespedeza**).
19. Leaves pinnate with more than 5 leaflets; flowers pink to purplish.



198. A. *Acacia mearnsii*
B. *Acacia parramattensis*

20. Shrub of slender habit; anthers tipped by gland; pod almost cylindrical, pith present between seeds.

19. *Indigofera* (p. 228)

20a. Decumbent herbs or subshrubs of low stature; anthers without apical gland. Pods with sunken suture, sometimes inflated when ripe, no pith between seeds.

20. *Swainsona* (p. 228)

19a. Leaves trifoliolate or bifoliolate.

21. Pod not separating into 1-seeded articles.

22. Slender shrubs or undershrubs; flowers yellow.

23. Leaflets digitate on very short petiole; flowers solitary or twin; pod inflated and nearly globular.

21. *Gompholobium* (p. 229)

23a. Leaves pinnately trifoliolate with slender petiole; flowers in racemes; pod flattened with thick margins.

22. *Goodia* (p. 229)

22a. Trailing or twining plants.

24. Flowers pink or purplish, less than 1 cm. long.

23. *Glycine* (p. 230)

24a. Flowers scarlet, at least 1.5 cm. long; plants prostrate.

24. *Kennedia* (p. 230)

21a. Pod separating into 1-seeded articles or reduced to 1 seed.

25. Pod 1-seeded; leaves pinnately trifoliolate.

25. *Lespedeza* (p. 230)

25a. Pod with several 1-seeded articles.

26. Bracts stipule-like and enclosing the flowers (and later the pods); leaves bifoliolate.

26. *Zornia* (p. 230)

26a. Bracts not enclosing the flowers or the pods; leaves pinnately trifoliolate; pod articles with clinging hairs.

27. *Desmodium* (p. 232)

1. *DAVIESIA* J. E. Sm. See *Thompson (1961b)*

1. Leaves not pungent pointed.

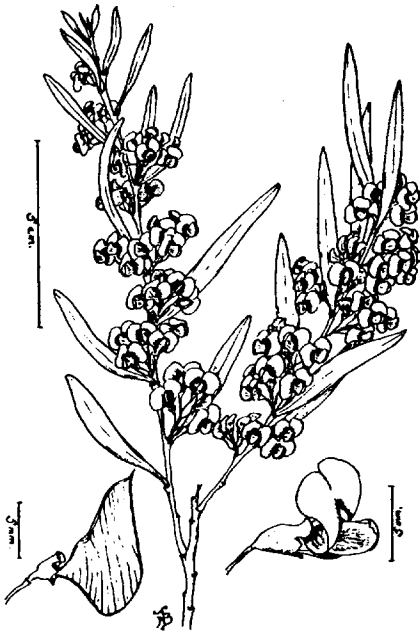
2. *Shrub to 2 metres high; leaves glabrous, oblong-elliptical or lanceolate, 4-8 cm. long, obtuse or acute; racemes shorter than leaves; pedicels slender, subtended by small bracts; calyx shortly lobed, 2 mm. long; standard petal twice as long as calyx, reniform, yellow with dark base; keel petals shorter than narrow wing petals and purplish at apices; pod shortly stipitate, 7-10 mm. long, reddish when young. Common throughout mountain areas, especially between 3000 and 4500 ft; incidence increased by fires; also New South Wales and Victoria. 'Bitter Pea'. Fig. 200.*

1. *D. mimosoides* R. Br.

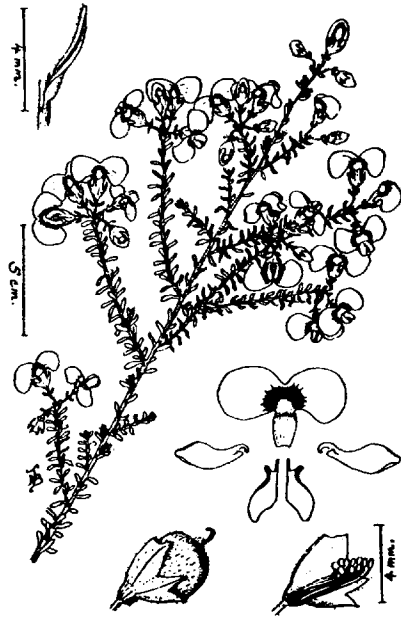
Note: It is possible that *D. latifolia* R. Br. with larger broader reticulately veined leaves and racemes more than 3 cm. long may occur in the A.C.T. as it grows in adjacent areas.

2a. *Low shrub or undershrub to less than 1 metre high; leaves mainly on lower parts of stems; leaves narrow linear to narrow elliptical, 3-9 cm. long; racemes shorter than leaves, single or clustered; pedicels sometimes very short; calyx 1.5 mm. long; standard petal twice as long as calyx, yellow with darker base; keel petals rusty-red; pod 8-10 mm. long. In dry sclerophyll forests at lower elevations; also Slopes and Tablelands of New South Wales and Victoria. 'Slender Bitter Pea'.*

2. *D. virgata* A. Cunn. ex W. J. Hook.



200. *Daviesia mimosoides*



201. *Dillwynia retorta* var.



202. *Mirbelia oxylobioides*



203. *Oxylobium alpestre*

1a. Leaves with pungent points.

3. Rigid intricately branched shrub less than 1 metre high, glabrous or minutely pubescent, *branchlets spinose at apices; leaves ovate or ovate-lanceolate*, with acuminate pungent apices, rigid, 7-20 mm. long, spreading; flowers solitary or few in axils, shortly pedicellate; calyx 1.5-2 mm. long; standard petal more than twice as long as calyx, orange with rust-red base, keel rust-red; pod 7-10 mm. long. Common above 3500 ft in mountain habitats; also south-eastern Queensland to Tasmania and South Australia. 'Gorse Bitter Pea'.

3. *D. ulicifolia* Andr.

3a. Leaves terete or linear; smaller branchlets not terminating in spines.

4. Densely branched shrub to 1 metre high; *leaves terete*, spreading, 1.5-2.5 cm. long (sometimes angular-flattened); flowers in very short *axillary racemes*; calyx slender, 2-2.5 mm. long; standard petal twice as long as calyx, yellow with darker base, keel petals shorter and dark coloured; pod shortly stipitate, 1 cm. long. At lower elevations, dry sclerophyll habitats in the A.C.T.; also Queensland to Victoria and South Australia. 'Spiny Bitter Pea'.

4. *D. genistifolia* A. Cunn. ex
Benth.

4a. Shrub to 1.5 metres high, branchlets glabrous or minutely pubescent; *leaves linear or linear-lanceolate, margins recurved*, 2-3 cm. long; *flowers solitary (less often several)* in leaf axils; calyx lobes acute and about as long as tube; standard petal orange with dark base, keel rusty-red; pod less than 1 cm. long. Black Mountain; Queensland, central and eastern New South Wales.

5. *D. acicularis* J. E. Sm.

2. DILLWYNIA J. E. Sm. *See Thompson (1961b)*

1. Leaves not pungent pointed; calyx tapering at base.

2. Bushy shrub to 1 metre high; leaves numerous, 3-8 mm. long, linear-terete, channelled above, *spirally twisted*, subglabrous or with stiff hairs; obliquely apiculate; flowers pedicellate in terminal clusters, pedicels with bracteoles below calyx; *calyx with sparse hairs*, 4-6 mm. long, campanulate, upper lobes joined higher; standard petals with reniform limb broader than long and retuse, golden-yellow with purple basal patch; wing and keel petals short, keel dark; pod ovoid, hairy. Common below 2500 ft in dry sclerophyll woodland and forest. Flowering early spring; also Queensland, New South Wales, and Victoria. 'Parrot Pea'. Fig. 201.

1. *D. retorta* (Wendl.) Druce var.
phylicoides (A. Cunn.) J.
Thompson

2a. Low shrub less than 50 cm. high (or to 1 metre); differing from above in the loose or appressed pubescence, the *leaves not twisted*, flowers paired in the axils and sessile or subsessile, the bracteoles soon deciduous; calyx 4-7 mm. long, *silky with appressed hairs*; corolla similar to that of preceding. Dry sclerophyll habitats similar to those of above; also Queensland to Tasmania and South Australia.

2. *D. sericea* A. Cunn.

1a. Shrub 1-1.5 metres high, branches with loosely appressed silky pubescence; *leaves angular-terete, pungent-pointed*, channelled above, spreading, 8-14 mm. long; *flowers in terminal racemes* or terminating short laterals from upper axils, shortly pedicellate, hairy bracteoles minute at base of hairy calyx which is *obtuse at the base*; standard petal as in above but wing and keel petals nearly twice as long as calyx; pod to 6 mm. long with corolla more or less persistent. On shallow soils of stony ridges with dry sclerophyll forest; also Queensland to Victoria.

3. *D. juniperina* Lodd.

3. **MIRBELIA** J. E. Sm. *See Thompson (1961b)*

Shrub, decumbent or erect to 1.5 metres high, branchlets with appressed silky hairs; leaves irregularly opposite or in whorls of 3, minutely petiolate, ovate to oblong but commonly elliptical, 4-10 mm. long, appressed-pubescent, margins recurved, midrib prominent on undersurface, apex with recurved apiculum; flowers in terminal racemose clusters, shortly pedicellate; calyx with deciduous bracteoles at base, 5-6 mm. long, lobes as long as tube; standard petal about twice as long as calyx, orange-yellow but purple veined at base, wing and keel petals slightly shorter, keel rusty- or purplish-red; pod 8-9 mm. long, hairy, ovoid-ellipsoid, with inner septum. (Two local forms may grow together, a decumbent type has smaller leaves and flowers, the erect type has longer internodes on the stem and the leaves and flowers fit the upper size range.) Dry sclerophyll forest, e.g., Black Mountain and Gudgenby area; also Tableland districts of New South Wales and in Victoria. 'Mountain Mirbelia'. Fig. 202.

M. oxylobioides F. Muell.

4. **OXYLOBIUM** Andr. *See Thompson (1961b)*

1. Leaves elliptical to lanceolate, margins recurved, apices not pungent; erect or ascendent shrubs.

2. Dense *erect* shrubs to 1.5 metres high, young branchlets pale-pubescent later glabrescent; *stipules lacking*; leaves shortly petiolate, commonly in irregular whorls of 3, ovate-oblong to elliptical, 1.5-3.5 cm. long, apiculate, *upper surface glabrous, reticulate and minutely tuberculate*, lower pubescent with prominent midrib; racemes terminal or in upper axils, short and dense; pedicels and calyces appressed silky-pubescent; calyx 5-7 mm. long, lobed to middle except the broad upper lobes, about $\frac{1}{2}$ as long as petals; standard orange-yellow, keel red; pod ellipsoid, villous, about twice as long as broad, inflated, shortly stipitate. Common in the mountains in the A.C.T. especially above 4000 ft (the plants more procumbent in exposed sites), flowering October-December; also on Tablelands of south-eastern New South Wales and in Victoria and Tasmania.

1. **O. ellipticum** (Labill.) R.Br.

2a. *Procumbent or ascendent undershrub*, young branches appressed pubescent later glabrescent; leaves opposite or in whorls of 3 with *setaceous stipules*, broadly oblong to lanceolate, 1-4 cm. long, glabrous, *reticulate above but with few or no tubercles between veinlets*, sparsely hairy below; racemes short in upper axils; pedicels, bracteoles, and calyces with appressed silky hairs; bracteoles adpressed to base of calyx; calyx as in preceding; petals about $1\frac{1}{2}$ times as long as calyx; standard golden-yellow, wings and keel red-tinged; pod hairy, ovoid-ellipsoid, 1-1.5 cm. long, shortly stipitate. Alpine woodland above 4000 ft, flowering about a month later than the preceding; also found on Southern Tablelands and Kosciusko region of New South Wales and in Victoria. Fig. 203.

2. **O. alpestre** F. Muell.

1a. *Procumbent or ascendent rhizomatous undershrub* to 30 cm. high. Leaves opposite or in irregular whorls of 3, *ovate to almost orbicular*, 1.5-2 cm. long, margins flat or undulate, upper surface reticulately veined and shining with few hairs on nerves, lower with more numerous hairs especially on prominent midrib which continues as *pungent mucro*; *stipules setaceous*; racemes terminal or axillary, bracteoles on the pedicels; calyx 6-8 mm. long, with bright appressed not dense hairs, lobed to middle, lower lobes acuminate; standard less than twice as long as calyx; pod 1-1.5 cm. long, villous, stipitate. Southern Tablelands of New South Wales and in Victoria; occurrence in the A.C.T. doubtful.

3. **O. procumbens** F. Muell.

5. **PLATYLOBIUM** J. E. Sm.

Small shrub (rarely more than 50 cm. in local plants), glabrous or minutely pubescent;

leaves opposite, cordate-ovate or lanceolate, 2.5-5 cm. long, 1-2 cm. wide, shortly petiolate, reticulately veined, upper surface glossy; stipules lanceolate striate, often recurved; flowers axillary on peduncles longer than striate bracts; bracteoles at base of calyx, linear to lanceolate, pubescent up the central line; calyx 6-8 mm. long, upper lobes broad and obtuse, lower shorter and acute; standard petal twice as long as calyx, wing and keel petals shorter; pod 2.5-4 cm. long, stipitate, obliquely and obtusely oblong, sparsely hairy especially on margins, winged on upper suture which later splits so that the valves roll back. In sclerophyll forest at upper elevations, collected western slopes of Mt Coree; also Queensland to Tasmania. Fig. 204.

P. formosum J. E. Sm.

6. **BOSSIAEA** Vent.

1. Stems terete or angular; leaves always present.

2. *Erect shrub to 2 metres high, foliage dark green, branches shortly pubescent, leaves often distichous along smaller branchlets; stipules small, ovate-acute; leaves 2-4 mm. long, broadly orbicular, glabrous above, pubescent below; petioles very short; flowers axillary along upper branchlets, bracts and bracteoles concealing short peduncles; calyx silky pubescent, upper lobes falcate acute, but not larger than lower 3; standard petal more than twice as long as calyx, all petals golden-yellow; pod flat, orbicular to shortly oblong, 7-10 mm. long, shortly stipitate, densely brown-villous. Common in sclerophyll forest on slopes above 4000 ft and in cool gullies; also New South Wales and eastern Victoria.*

1. **B. foliosa** A. Cunn.

2a. Prostrate or trailing undershrub with woody rootstock, appressed pubescent or glabrescent; pod oblong, subsessile.

3. Spreading undershrub, the branches with loosely distichous alternate leaves; stipules narrow linear, longer than minute petiole; leaves ovate or oblong, 3-8 mm. long, obtuse, margins recurved; flowers few, axillary, solitary on slender peduncles with pair of bracteoles near the middle; calyx sparsely hairy, 4-5 mm. long, *upper lobes broader and longer than lower and joined higher with oblique apices*; standard more than twice as long as calyx, yellow within, *brown on back*, wing and keel petals shorter, keel dark red; pod 2-3 cm. long, 5-6 mm. wide, *margins ciliate*. Common in dry sclerophyll forest and woodland below 3000 ft; also Queensland to Victoria. Fig. 205.

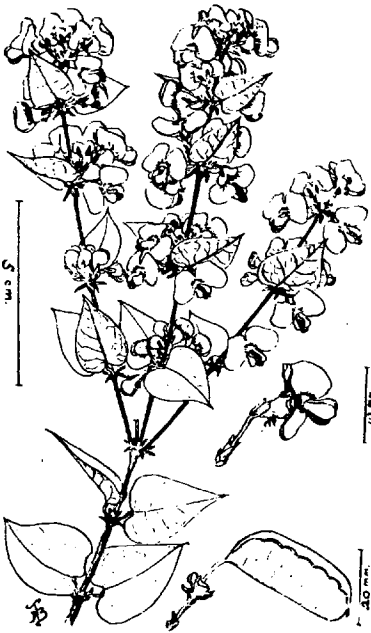
2. **B. buxifolia** A. Cunn.

3a. Stems slender, prostrate, trailing to 50 cm. long, *stipules shorter than petiole*, narrow acuminate; leaves 5-15 mm. long, broad ovate to narrow oblong-ovate, apiculate-mucronate; flowers solitary, few in upper axils; peduncles longer than calyx, with pair of narrow bracteoles below the middle, lengthening in fruit; calyx campanulate, lobes scarcely longer than tube, *upper lobes ovate and broader than lower but not joined higher; standard pinkish-red on back*, yellow within, more than twice as long as calyx, wing and keel petals dark red; pod similar to that of preceding, 1.5-2.5 cm. long, *glabrous or with scanty hairs on upper suture only*. Black Mountain and Gibraltar Creek; also Queensland to Tasmania and South Australia.

3. **B. prostrata** R.Br.

1a. Stems and branches flattened, leaves often absent except on young shoots.

4. Glabrous shrub 1-2 metres high with flattened winged branches; leaves commonly absent; flowers solitary in notches of stem; *peduncles covered by bracts and bracteoles*, the latter more than $\frac{1}{2}$ as long as calyx; *calyx 5.5-6 mm. long, lobes shorter than tube but similar in size and shape*, ciliate with minute woolly hairs, pubescent on centre of inner face; *standard petal blotched or streaky on back, yellow within*, at least twice as long as calyx, keel darker than wing petals; pod stipitate, oblong, 2.5-3.5 cm. long, *commonly 6-8-seeded*, margins



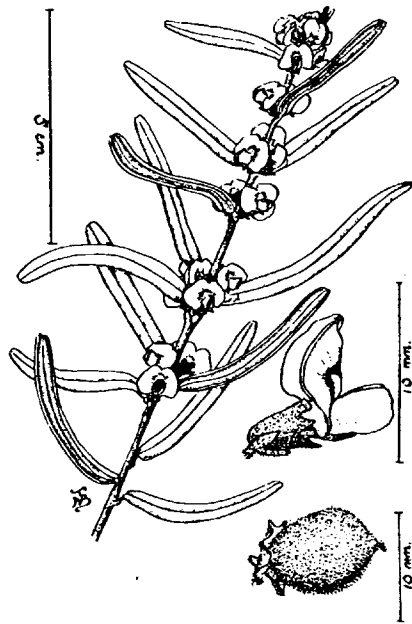
204. *Platylobium formosum*



205. *Bossiaea buxifolia*



206. *Pultenaea procumbens*



207. *Hovea rosmarinifolia*

thickened; persistent calyx appearing truncate due to loss of lobes. In vicinity of Casuarina Sands, Murrumbidgee River; south-eastern New South Wales, Victoria. Has been confused locally with the coastal *B. ensata* Sieb. ex DC. in which the peduncles are not wholly covered by bracts and the upper lobes of the calyx are united in a broad emarginate lip.

4. *B. bracteosa* F. Muell. ex Benth.

4a. Small shrub with narrow flattened stems less than 2 mm. wide, peduncles longer than bracts and bracteoles, the latter attached to middle of peduncle; *calyx* 2.5-3 mm. long, *upper lobes forming a broad emarginate lip, lower lobes acute and about ¼ the length of the tube*; petals more than twice as long as calyx, *standard purplish on back, pale yellow within*, wing and keel petals purplish; *pod* 1.5-2 cm. long, 4-6 seeded. Naas Valley and Boboyan area; eastern New South Wales to Victoria and Tasmania.

5. *B. riparia* A. Cunn. ex Benth.

7. *PULTENAEA* J. E. Sm. *See Thompson (1961b)*

1. Spreading shrub to 1.5 metres high, young branchlets pubescent; stipules brown, 1-2 mm. long; *leaves opposite or in whorls of 3, broadly ovate or rhomboidal*, glabrous, slightly glaucous, 1-1.5 cm. long, mucronate, sometimes 3-5-nerved at base; flowers in upper axils, peduncles 3-5 mm. long, bracteoles subulate, basally attached to calyx of 5-8 mm. length with lobes longer than tube, pubescent within and ciliate; standard and wing petals bright yellow, keel red, all about 1½-2 times as long as calyx; pod glabrous, about as long as calyx. Mt Ainslie; south-eastern Queensland to north-eastern Victoria. 'Bush Pea'.

1. *P. cunninghamii* (Benth.)

Williamson

1a. Leaves neither ovate nor in whorls.

2. Leaves concave above, the margins incurved or inrolled.

3. Leaves inrolled-terete and channelled above; bracteoles leaf-like with or without small stipular lobes at base.

4. Low undershrub, *small branchlets with basal cluster of dark narrow stipules; leaves with appressed hairs or glabrescent, mucronate*; stipules dark brown, linear-acuminate, 1 mm. long, spreading; flowers not numerous, axillary; bracteoles attached at base of calyx, *about as long as tube, linear-terete, sericeous, without stipular lobes at base*; calyx sericeous, 5-6 mm. long, lobes acuminate, as long as tube, upper two united to middle, pubescent within; standard petal orange-yellow with red centre, about 1½ times as long as calyx; ovary pubescent-villous; pod to 5 mm. long. In alpine woodland and grassy sward at higher elevations; Tablelands and Kosciusko region of New South Wales, Victoria, and Tasmania.

2. *P. fasciculata* Benth.

4a. Prostrate undershrub forming low mats; *leaves villous with spreading hairs or later scabrid, with recurved apiculum*; stipules of stem leaves ovate-lanceolate, erect, about 0.5 mm. long but larger at bases of upper leaves and flowering shoots and *joined in broad ovate brown bracts with ciliate margins and a mucro from the narrow central notch*; flowers axillary but clustered on short lateral shoots; bracteoles villous, attached to base of calyx, *about as long as whole calyx*, the thin base with projecting glands or small stipular lobes; calyx 3.5-4.5 mm. long, tube sparsely villous, shorter than villous acuminate lobes, upper lobes joined to middle, falcate, pubescent within; standard petal orange-yellow, less than 1½ times as long as calyx, wings yellow, keel shorter and dark red above; ovary and lower half of style villous-pubescent; pod 6-8 mm. long, hirsute and finely transversely rugose. Dry sclerophyll forest habitats below 2500 ft; also Victoria and South Australia.

3. *P. laxiflora* Benth.

3a. Leaves linear-elliptical, lanceolate or oblanceolate; stipules 2-5 mm. long.

5. Flowers crowded at ends of branches; bracteoles 3-lobed with conspicuous lateral lobes; standard petals rich orange-yellow, less than twice as long as calyx; ovary glabrous apart from apical hairs, style glabrous or almost so.

6. Dense low shrub or undershrub to 0.5 metres high or procumbent, branchlets pubescent; stipules 2-5 mm. long, narrow lanceolate or setaceous; *leaves lanceolate to obovate, recurved*, 3-8 mm. long *with pungent mucro*, margins incurved above, 3-5-nerved, lower surface sparsely hairy; flowers shortly pedicellate; *bracteoles attached high on calyx tube*, central lobe leaf-like and pungent pointed, lateral lobes similar to upper stipules; calyx 5-7 mm. long, loosely villous or glabrous, upper lobes joined to middle, all lobes with pungent apices; petals less than $1\frac{1}{2}$ times as long as calyx, keel red; ovary with hairs at apex; pod 5 mm. long. Common in woodland and dry sclerophyll forest, e.g. Black Mountain, Mt Ainslie, hills near Queanbeyan; also Tablelands and south-western Slopes of New South Wales and in Victoria. Fig. 206.

4. **P. procumbens** A. Cunn.

6a. Small or procumbent shrub, branchlets pubescent; stipules 2-4 mm. long but longer and broader under the flowers; *leaves linear-terete to elliptical*, 7-12 mm. long, *concave and glabrous above*, villous or glabrescent-tuberculate below; bracteoles attached low on calyx tube, central lobe subulate, laterals stiff and brown, pubescent up the median line, ciliate on margins; calyx villous above but partly enclosed in stipules of subtending leaf, 5-6 mm. long, lobes acuminate with subulate not pungent apices; petals similar to those of preceding species; *ovary with long apical hairs*; pod about as long as calyx. Not uncommon in dry sclerophyll forest and woodland at lower altitudes; also Tablelands of New South Wales.

5. **P. subspicata** Benth.

5a. Ascendent shrub with pubescent branches; stipules lanceolate, ciliate, erect; leaves glabrous, petiolate, linear-elliptical to narrow lanceolate, 10-15 mm. long, concave with upper margins incurved to *pungent apical mucro*, midrib broad below on undersurface; *flowers on short laterals along upper branches*; pedicels pubescent; *bracteoles at base of calyx tube* and shorter than it, *ovate with pubescent midrib*, the scarios brown margins ciliate; calyx 4-5 mm., tube glabrous, lobes shorter than tube, ciliate, acute and mucronate, upper pair joined to middle; standard petal golden-yellow and *dark veined on back*, *more than twice as long as calyx*, wings yellow, keel red in upper half; ovary and lower part of style villous-pubescent; pod inflated, 6-8 mm. long, hairy. Not common in the A.C.T., collected on western slopes of Mt Coree (A.C.T./N.S.W. border); also Tablelands of New South Wales and Victoria. 'Prickly Bush Pea'.

6. **P. juniperina** Labill. var. **planifolia** Williamson

2a. Leaves with recurved or revolute margins.

7. Small erect shrub to 1 metre high or sometimes procumbent; branches appressed pubescent, stipules dark brown, setaceous, 1 mm. long, *leaves oblanceolate to narrow cuneate*, 4-6 mm. long, appressed pubescent, obtuse, apex more or less conduplicate and with minute recurved apiculum; *flowers axillary, not clustered but along short lateral shoots*; bracteoles attached low on tube, subulate, *shorter than calyx tube*, sericeous; calyx 4-6 mm. long, sericeous-pubescent, lobes as long as tube, upper pair joined to middle; petals twice as long as calyx; standard orange-yellow with dark centre, wings yellow, keel red above; *ovary pubescent*; pod about 4 mm. long. Not uncommon in areas north and east of Canberra; also south-eastern Queensland and eastern New South Wales.

7. **P. microphylla** Sieb. ex DC.
var. **microphylla**

7a. Flowers in terminal clusters or heads surrounded by stiff brown bracts; low undershrubs

with weak slender stems; leaves elliptical to oblanceolate, minutely petiolate, mucronate; bracteoles longer than calyx tube; ovary and base of style villous.

8. Stems appressed-sericeous; *stipules setaceous*, dark brown, 1-2 mm. long; leaves not numerous on stems, 4-10 mm. long, upper face glabrous, reticulate when dry, *lower surface sericeous*, midrib prominent, apices recurved and minutely apiculate or (on upper leaves) mucronate; *flowers in dense heads to 15 mm. diameter, surrounded by stiff dark brown bracts*; bracts longer than calyx tube (the lower ones empty), sparsely appressed-villous on back, ciliate; 3-lobed, lateral lobes broad, or (on upper ones) with acuminate apices, central lobe lanceolate-subulate and ciliate towards base; *bracteoles subulate*, attached at or below middle of calyx tube; calyx with loosely appressed silky hairs, lobes lanceolate, subulate apices glabrous; upper pair united to middle; standard petal orange with dark veins on back, wing petals yellow, keel rust-red or purplish-red. Procumbent among grasses in Eucalypt woodland, Boboyan-Gudgenby area of A.C.T.; also Central and Southern Tablelands of New South Wales and in Victoria.

8. *P. capitellata* Sieb. ex DC.

8a. Habit similar to that of preceding but branchlets more numerous; *stems hirsute with spreading hairs*; *stipules scarious*, light to copper brown, 1-2.5 mm. long, *broadly ovate-oblong with 2 thickened 'nerves' continued above in subulate points*, margins ciliate, sometimes with short teeth in apical notch; leaves elliptical to oblanceolate, 4-6 mm. long, upper surface shining, reticulate (dry), not deeply grooved, *lower surface hirsute*, midrib prominent, apex recurved and with curved subulate mucro 0.5-1 mm. long; *flowers 2-4 per terminal cluster*, bracts slightly darker brown and larger than stipules, of stiffer texture, broadly ovate, sparsely and irregularly hairy on back, margins ciliate, lateral lobes broad but with thicker points at inner margins which form a narrow sinus about the villous subulate central lobe; bracteoles attached low on calyx tube, *narrow lanceolate* villous on back, the subulate apex glabrous; calyx 5-6 mm. long, tube sparsely hirsute below, densely so above, lobes lanceolate but narrowed to subulate (often curved) apices, upper lobes joined to middle; standard and wing petals yellow, keel dark red in upper half. Among grasses in subalpine woodland in Upper Cotter Valley, A.C.T. Apparently undescribed.

9. *P.* sp.

8. HOVEA R.Br.

1. *Low plants with few stems from woody rootstock*, pubescent with *simple straight hairs*; leaves alternate, apiculate, upper surface reticulate-rugose (dry); *lower leaves ovate or oblong*, obtuse, 0.8-1.5 cm. long, *upper leaves linear or linear-lanceolate*, to 5 cm. long and acuminate; flowers shortly pedicellate, 2 or 3 per upper axil; calyx with broad truncate upper lip slightly longer than lower lobes, villous with dark grey hairs; standard petals almost twice as long as calyx, pale violet with yellow claw below darker base, wings and keel slightly shorter; pod slightly oblique, 7-9 mm. long, pubescent or glabrescent, inflated. In dry sclerophyll habitats, shallow stony soils as on Black Mountain and other sites in vicinity of Canberra; widespread but not locally common; also from south-eastern Queensland to Tasmania and south-east of South Australia.

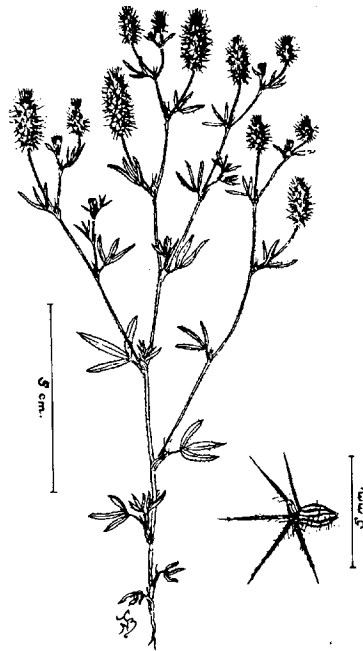
1. *H. heterophylla* A. Cunn. ex J. D. Hook.

1a. *Bushy shrub or ascendent undershrub*; lower leaves similar to upper; *hairs of lower surfaces of leaves crimped or matted*; pods densely brown-pubescent.

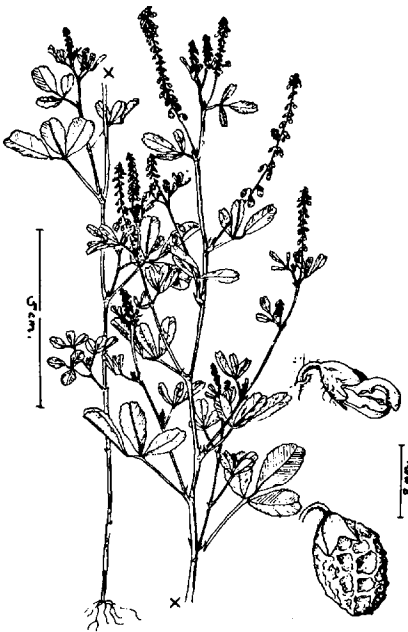
2. *Shrub to 2 metres high*, branches pubescent with grey-brown appressed hairs; leaves linear-oblong or narrow lanceolate, obtuse-apiculate, 1.5-2 cm. long, margins recurved or revolute, upper surface glabrous with *prominent reticulation* (when dry), lower surface sparsely clothed with crimped tomentum which is *mixed with longer hairs on prominent*



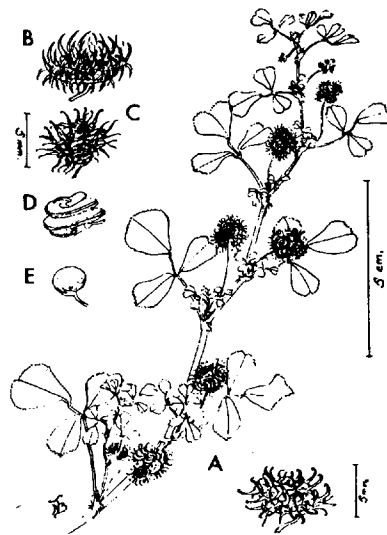
208. *Hardenbergia violacea*



209. *Trifolium arvense*



210. *Melilotus indicus*



211. A. *Medicago polymorpha* var.
 B. *Medicago arabica*
 C. *Medicago minima*
 D. *Medicago sativa*
 E. *Medicago lupulina*

midrib; calyx villous with pale hairs mixed with brown tomentum; petals as for preceding species; pod 12-14 mm. long. In open sites in cool shaded gullies in wet sclerophyll forest, Cotter Valley; also Australian Alps and eastern Victoria. 'Mountain Hovea'. Fig. 207.

2. *H. rosmarinifolia* A. Cunn. var.
rosmarinifolia

2a. *Low ascendent undershrub*, sometimes more than 1 metre in diameter; leaves shorter and more obtuse than, and flowers similar to those of above but *lacking long hairs mixed with tomentum and the reticulation of upper surfaces of leaves not prominent* (when dry). White-flowered individuals not uncommon. Common in open sites in alpine woodland and on exposed grassy slopes above 4500 ft; also New South Wales (Australian Alps), eastern Victoria and Tasmania. Possibly distinct at species level. 'Alpine Hovea'.

3. *H. purpurea* Sweet var. *montana*
J. D. Hook.

9. **HARDENBERGIA** Benth.

Trailing glabrous plants, prostrate or supported by shrubs; leaves alternate with one leaflet on very short petiolule subtended by minute stipellae on summit of slender petiole; lanceolate to ovate or almost truncate at base, 5-8 cm. long, coriaceous, shining, reticulately veined but paler below; flowers in axillary simple or branched racemes or in terminal panicles of racemes, pedicels paired and longer than calyx; calyx 3-4 mm. long, shortly lobed, upper lobes more or less united; standard broadly orbicular, purple, more than twice as long as calyx; wings and keel purple, shorter than standard; pod oblong, 2-4 cm. long, valves hard with membranous pith between the seeds. Common in dry sclerophyll habitats from 2000 to 3500 ft; from Queensland to Tasmania (where perhaps introduced) and South Australia. 'False Sarsaparilla'. Fig. 208.

H. violacea (Schneev.) Stearn

10. **TRIFOLIUM** L.

Note: A number of species of clover have been introduced into Australia for pasture purposes and others have become naturalised weeds. As Canberra is a centre for pasture research it is possible that species other than those treated here may be found. The occurrence of these is likely to be restricted to the vicinity of experimental areas.

1. Plants with narrow linear or narrow linear-oblong leaflets; calyces softly villous with filiform lobes longer than the tube in flower; corolla pinkish; annual species.

2. Erect or ascendent villous herb; early leaves with slender petioles and with oblong leaflets; stem leaves shortly petioled, the narrow leaflets to 2 cm. long; stipules scarious-striate, *fused to petiole for half their length (less than 6 mm.)* and with slender subulate apices; heads numerous, soft, pedunculate, *in axils or terminal*, oblong becoming cylindrical, to 3 cm. long; calyx tube ovoid, with red setaceous-filiform plumose lobes 3-4 times as long; petals not twice as long as calyx tube. Common and widespread summer weed, native to temperate parts of Europe and Asia; naturalised in temperate areas of Australia and Tasmania. 'Haresfoot Clover'. Fig. 209.

1. **T. arvense* L.

2a. *Stiffly erect herb* with appressed villous stems and leaves; leaflets of lower leaves narrowly oblong, obtuse or minutely toothed apically; leaflets of stem leaves very narrow linear, 2-5 cm. long, acuminate; petioles with conspicuous scarious-striate *stipules fused for more than 10 mm. (to 20 mm.)* and with narrow linear-subulate apices at least $\frac{1}{2}$ as long; *flower spikes terminal*, ovoid to cylindrical, to 10 cm. long; calyx tube and rigid lobes with spreading shining hairs with tubercle bases; standard petal about as long as calyx tube. In the A.C.T. this is much less common than the preceding, usually in cultivated or waste ground or on

roadsides; of Mediterranean origin and widespread in temperate districts especially in warm dry areas. 'Narrow-leaf Clover'.

2. **T. angustifolium* L.

1a. Plants with oblanceolate, obovate, obcordate or elliptical-ovate leaflets.

3. Flowers yellow; leaves pinnately trifoliate; annuals.

4. Procumbent or ascendent with simple or branched sparsely hairy stems and petioles; stipules broadly ovate, acuminate, ciliate; petioles short; leaflets 6-8 mm. long, obovate or obcordate, denticulate above, often slightly emarginate, glabrous; heads on slender axillary peduncles longer than leaves, with 10-20 flowers which later turn brown, the minute pedicels later deflexed; calyx glabrous, tube 1 mm. long with 2 upper lobes shorter and more acute than 3 lower acuminate ones; standard 3-4 times as long as calyx tube, faintly striate and *folded lengthwise* about the developing pod. Common weed in cultivated ground and in pastures; of European origin but widely naturalised in temperate districts. 'Yellow Suckling Clover'.

3. **T. dubium* Sibth.

4a. Erect or ascendent herb differing from above in *many-flowered (more than 30) oblong heads* and in the standard petals which (in fruiting heads) become slightly enlarged and *broadened into a striate spoon-shaped portion hooded over the pod and other petals*; petals a deeper yellow than in preceding species, turning light brown in fruiting stage. A common weed of cultivated ground and pastures; native to Europe and western Asia; widely naturalised in temperate districts of Australia and Tasmania. 'Hop Clover'.

4. **T. campestre* Schreb.

3a. Flowers white or pink; leaves digitately trifoliate.

5. Heads pedunculate, the peduncles as long as the petioles or longer, or lengthened in fruiting stage.

6. Procumbent, rhizomatous and stoloniferous *perennial, glabrous or with hairs on petioles*; stipules striate, *oblong with short subulate points*; leaflets broadly obovate, minutely denticulate, rounded-obtuse, often marked by obliquely angled white streak; *heads on peduncles longer than leaves; white flowers numerous, at first erect later the pedicels reflexed*; calyx striate, *lobes lanceolate* with green centre and white margins, scarcely as long as tube, glabrous or with few scanty hairs; standard petal longer than calyx tube. Commonly used in lawns or present as a contaminant, a common garden weed, widely naturalised in pastures of cool habitats with summer moisture; to be seen along roadsides and in gullies up to high elevations in the mountains. In wet sites leaflets up to 2-3 cm. long, but 5-8 mm. in drier places; of European origin. 'White Clover'.

5. **T. repens* L.

6a. *Prostrate villous annual*; stipules herbaceous, *broadly ovate with acute points*; petioles from longer than to as long as leaflets; leaflets obovate or obcordate, irregularly denticulate, 4-20 mm. long; heads on peduncles usually elongated to longer than petioles in fruiting stage; *both sterile and fertile flowers present; fertile ones 3-8*; calyx 3-4 mm. long, slender, glabrous or sparsely hairy, sometimes reddish, *lobes setaceous, hairy and longer than tube*; petals white, standard longer than calyx; sterile flowers in upper part of head, reduced to rigid calyces with spreading teeth; after flowering all flowers reflexed but in an erect position because of the *recurving of the peduncles* which results in the burying of most of the fruiting heads in the soil. In this position the fertile flowers are protected by the sterile as the pods develop. A native of western and southern Europe and the Mediterranean but now the most important clover grown in temperate Australia; sometimes found as lawn contaminant. 'Subterranean Clover'.

6. **T. subterraneum* L.

5a. Heads sessile or subsessile, peduncles always short, never as long as the subtending petioles and not much elongated in fruiting stage.

7. Heads terminal or terminal and in uppermost leaf axils; embraced by enlarged stipules of the subtending leaves whose petioles are much shortened.

8. *Robust perennial* with erect or decumbent almost glabrous stems; stipules large, the fused part striate and 12-20 mm. long, the free points ovate with subulate apices as long as base, nerves purplish-red; petioles progressively shorter up the stem so little or no petiole separates stipules and leaflets in the uppermost leaves; leaflets elliptical to obovate, obtuse, 1.5-5 cm. long, entire or obscurely denticulate; sparsely hairy or glabrescent; heads globose to ovoid, 2-2.5 cm. diameter; flowers numerous, petals deep pinkish-red, 14-18 mm. long; calyx tube narrow, striate, 2 mm. long, sparsely hairy with dense hairs in the throat; lobes narrow or subulate with stiff spreading hairs; lowest lobe at least twice as long as tube; others as long as tube. Of European origin, widely grown as a fodder plant and naturalised in a few places near Canberra. 'Red Clover'.

7. *T. pratense L.

8a. *Procumbent or ascendent annual*, stems and leaves woolly or sparsely villous; stipules hairy, striate with purple nerves when young, later striate but scarious, fused part 4-5 mm. long, free part with subulate apices nearly as long; leaflets oblanceolate or obovate, 5-15 mm. long, margins minutely denticulate or subentire; heads oblong, flowers not very numerous; calyx villous-pubescent, tube striate with 10 nerves, 2-2.5 mm. long, slightly inflated-urceolate, lobes rigid-subulate; petals pink, standard about 1½ times as long as calyx tube. Weed of cultivated ground; native to Europe, western Asia and northern Africa; widely naturalised in temperate Australia and Tasmania. 'Knotted Clover'.

8. *T. striatum L.

7a. Heads axillary in the majority of the leaf axils, not embraced by enlarged stipules; procumbent or ascendent annual.

9. Plants more or less glabrous or with few hairs on petiolules; lower leaves with slender petioles, upper sometimes shorter than subtended heads; stipules narrow-oblong with long acuminate points, nerves prominent; leaflets obovate to oblanceolate, 6-14 mm. long, rounded-obtuse, sharply denticulate; heads sessile, globular, with flowers numerous; calyx tube striate and longer than the spreading or (later) reflexed ovate lobes with spinose points; the narrow pink corollas projecting to give head a characteristic appearance. Weed of cultivated ground and pastures; native to western and southern Europe but now widely naturalised in temperate Australia and Tasmania. 'Clustered Clover'.

9. *T. glomeratum L.

9a. Stems and leaves glabrous; fused part of stipules 2-3 mm. long, free part about as long with subulate apices; petioles of upper leaves shorter than lower ones but always well-developed; leaflets obovate, 6-12 mm. long, rounded obtuse, margins sharply denticulate; heads shortly pedunculate or subsessile when young, inconspicuous in flower; calyx tube smooth and glabrous on underside and on lower lobes but upper side and upper lobes densely woolly or silky-villous, the hairs more or less appressed in flower; corolla pinkish, slightly longer than tube; heads later forming hairy or woolly balls due to inflation of upper calyx lobes which become scarious and bladderly. Weed of cultivated ground; of Mediterranean origin but now widely naturalised in temperate Australia and Tasmania. 'Woolly Clover'.

10. *T. tomentosum L.

11. MELILOTUS Mill.

1. Erect almost glabrous biennial herb to 2 metres high; stipules setaceous; leaves pinnately trifoliate; leaflets ovate to linear-oblong, margins minutely serrate above a cuneate base, pale underneath; flowers in axillary or terminal racemes which elongate after flowering;

calyx 1.5-2 mm. long, subulate lobes about as long as tube; *standard petal 4-5 mm. long, white*, slightly longer than wings and keel; pod ovoid, brown, reticulately marked, 3-3.5 mm. long. A fodder species naturalised on roadsides and waste places; native to Europe and western Asia but now naturalised in many areas of temperate Australia and Tasmania though rarely common. 'Bokhara Clover'.

1. **M. albus* Medik.

1a. Erect glabrous annual to 1 metre high; *flowers approximately 2 mm. long, petals pale yellow (drying yellow)*. Naturalised or cultivated, eaten when young by stock but contains coumarin which taints milk and eggs. Flour may also be tainted if this plant is harvested with wheat. Native from southern Mediterranean to southern Asia; widely naturalised in temperate Australia and Tasmania. 'King Island Melilot', 'Hexham Scented Melilot'. Fig. 210.

2. **M. indicus* (L.) All.

12. **MEDICAGO** L. See Heyn (1963)

1. Prostrate or procumbent annual or short-lived perennial; younger parts villous-pubescent; stipules ovate-acuminate with undulate shallowly toothed margins; petioles rather short; leaflets obovate to cuneate, finely denticulate above; flowers 1-1.5 mm. long, shortly pedicellate in dense racemes on slender axillary peduncles longer than leaves; calyx hairy; petals bright yellow; *pod reniform, about 3 mm. on broadest dimension, strongly curved but not coiled, valves nervate and black when mature*. Weed of cultivated ground and disturbed areas, common in the vicinity of Canberra; native to Europe and Asia, now widely naturalised in temperate Australia and Tasmania. 'Black Medic'. Fig. 211E.

1. **M. lupulina* L.

1a. Pod coiled.

2. Sparsely villous-pubescent or glabrescent *perennial*; stipules lanceolate acuminate, margins undulate and entire or slightly toothed; petioles short on flowering shoots; leaflets obovate to narrowly obovate, margins denticulate above the cuneate base; *flowers violet or purple*; 8-9 mm. long in pedunculate axillary racemes; calyx hairy, lobes acuminate and longer than tube; standard petal more than 4 times as long as calyx tube; pod coiled 2-3 times, *margins smooth*, sides reticulate. Important fodder legume grown in all States and naturalised in many places; in the vicinity of Canberra on roadsides and cultivated areas, often spread in top dressings taken from alluvial areas, native to Europe and Asia. 'Lucerne'. Fig. 211D.

2. **M. sativa* L.

2a. Flowers yellow; pod bordered by curved or hooked spines.

3. Stipules toothed; plants glabrous or with sparse loose hairs on some parts, annual.

4. Prostrate herb, sparsely hairy on younger parts; stipules acuminate; leaflets cuneate to obovate-cuneate, margin denticulate, *with a red or purplish often lunate mark above middle of upper surface*; racemes few-flowered on axillary peduncles; calyx sparsely hairy; petals longer than calyx; *pod almost globose with 4-5 coils, margins of valves with curved interlocking spines not or rarely hooked at apices*, sides of valves not reticulately marked. Introduced for fodder purposes but now naturalised in a few sites in the A.C.T.; native to Mediterranean area and western Asia and naturalised in some parts of temperate Australia and Tasmania. 'Spotted Medic'. Fig. 211B.

3. **M. arabica* (L.) Huds.

4a. Procumbent, prostrate or ascendent almost glabrous herb; stipules deeply toothed, acuminate; leaflets cuneate to obovate-cuneate, denticulate above cuneate base; racemes few-flowered, on axillary peduncles; flowers small; *pod with 2-3 turns and more or less discoid, valves reticulately marked and with conspicuous hooked spines*. Common and wide-

spread weed of gardens and cultivated ground; native to western Europe and the Mediterranean and naturalised in southern and eastern Australia. 'Burr Medic'. Fig. 211A.

4. **M. polymorpha* L. var. *vulgaris*
(Benth.) Shinnars

3a. Procumbent or ascendent *softly pubescent* herb; *stipules almost or quite entire*, lanceolate acuminate; leaflets obovate to cuneate, with rounded or acute teeth in upper part; flowers 1-3 on peduncles often shorter than leaves; standard petal not much longer than calyx; *pod almost globose with 4-5 turns, margins with conspicuous hooked spines, valves not conspicuously reticulate*. Widely naturalised in pastures and on waste ground in the A.C.T. and also throughout southern Australia and Tasmania; native to southern Europe, western Asia, and northern Africa. 'Small Woolly Burr Medic'. Fig. 211C.

5. **M. minima* (L.) L.

13. TRIGONELLA L.

Prostrate glabrous annual or short-lived perennial; stipules scarious, lanceolate with slender acuminate apices; petioles slender and longer than leaflets; leaves digitately trifoliate, leaflets oblanceolate to obovate, denticulate above or almost truncate; heads few-flowered on slender axillary peduncles; calyx tube narrow, almost glabrous, 2-2.5 mm. long with acuminate lobes almost as long; petals white or pinkish, standard about 3 times as long as calyx tube; pod sparsely hairy or glabrescent, slightly falcate, about 3 times as long as calyx tube. In muddy sites near Lake George (N.S.W.), likely to appear in the vicinity of Lake Burley Griffin; native to Europe and northern Africa, naturalised in a few places in eastern and southern Australia and Tasmania. 'Birdsfoot Fenugreek'. (Placed in *Trifolium* by some authors.) Fig. 212.

**T. ornithopodioides* (L.) DC.

14. TELINE Medik.

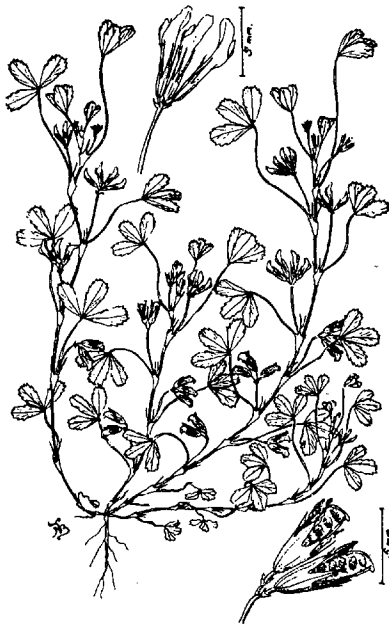
Erect shrub to 2 metres high; branches striate-grooved, pubescent with crimped hairs which are mixed with longer spreading ones on young and flowering shoots, glabrescent with age; stipules small ovate-triangular, free from short petiole; leaves digitately trifoliate, leaflets oblanceolate, obtuse-apiculate, villous when young especially on prominent midrib of lower surface, when fresh green above and greyish below, petiolulate, 10-20 mm. long; flowers in racemose clusters at ends of short laterals often with a few solitary in uppermost axils below cluster; bracteoles narrow, scarious, attached at base of and shorter than tube; calyx villous, 5-6 mm. long, upper lip of 2 acuminate lobes as long as tube, lower with 3 short subulate lobes; corolla bright yellow, standard 10-12 mm. long, keel hairy towards apex; pod slightly curved, several-seeded. A garden escape established in a few places in the vicinity of Canberra; naturalised in a number of localities of southern and eastern Australia if correctly reported. 'Spanish Broom'.

**T. monspessulana* (L.) K. Koch

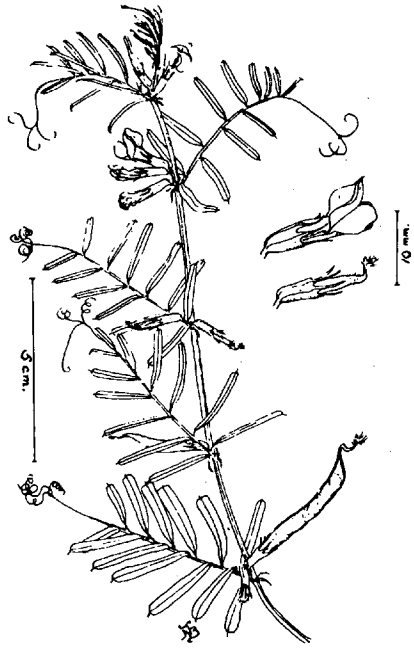
15. VICIA L. *See Hermann (1960)*

1. Pods with more than 2 seeds; flowers 1-2 in upper axils.

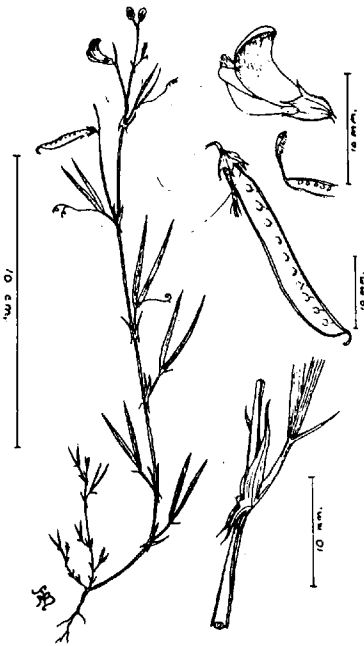
2. Weak procumbent or ascendent annual, sparsely hairy; *stipules with several long acuminate spreading lobes*; leaves pinnate, *leaflets* irregularly paired, *oblanceolate, obovate-cuneate or broadly cuneate*, truncate, emarginate but apiculate, the uppermost modified into simple or pinnate tendrils; calyx 1.5-2 cm. long, *the narrow acuminate lobes longer than tube*, ciliate; standard petal purple, about 1½ times as long as calyx; wing and keel petals reddish; *pod 4-6 cm. long, not turning black when mature*, 6-10-seeded, minutely pubescent. A variable species often difficult to separate from the following with which it may hybridise; not common as a naturalised weed in the A.C.T. but established in Hall area at least; of Asian



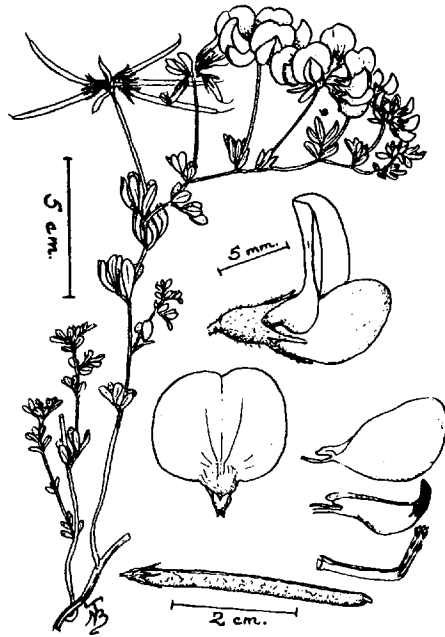
212. *Trigonella ornithopodioides*



213. *Vicia angustifolia*



214. *Lathyrus angulatus*



215. *Lotus australis*

origin but common in Europe from where it has been carried to most temperate countries including Australia and Tasmania. 'Common Vetch'.

1. **V. sativa* L.

2a. Close to above but the *stipules with few or no teeth* (then ovate-acuminate); leaflets truncate-apiculate; *calyx 1-1.5 cm. long, lobes shorter than tube*; standard petal up to twice as long as calyx; *pod smaller, to 3.5 cm. long (in A.C.T.), turning black when mature*. More common in the A.C.T. than preceding, native to Mediterranean, Europe, western Asia. Often treated as variety of *V. sativa* and, like it, sometimes planted in pastures or as green manure crop. 'Narrow-leaved Vetch'. Fig. 213.

2. **V. angustifolia* L.

1a. Pod 2-seeded; flowers in pedunculate racemes.

3. Trailing or procumbent annual, sparsely hairy, stipules narrow and commonly with 1 divergent lobe; leaflets irregularly arranged, *narrow-oblong to narrow-elliptical, obtuse* but margins inrolled to apiculum; *calyx 3-4 mm. long, the 3 lower lobes longer than both the tube and the upper lobes*, all lobes with spreading hairs; *standard pinkish, keel dark tipped; pod very flat when immature and with wide margins around the seeds, 1.5-2.5 cm. or more long, obliquely acute-acuminate glabrous or with scanty hairs along upper suture*. Mediterranean species naturalised in the Black Mountain area from trial plots at CSIRO. 'Two-seeded Vetch'.

3. **V. disperma* DC.

3a. A slender species with habit and general appearance similar to that of preceding one but differing in stipules (of lower leaves) with several narrow divergent lobes or the upper ones entire; *leaflets narrow-linear, truncate apiculate; calyx sparsely hairy; 2-3 mm. long, lobes equal in length with fine subulate apices and not villous-hairy; standard petal white or blue-tinged about twice as long as calyx, keel dark tipped; pod hairy, plump, 8-10 mm. long, obliquely obtuse or shortly acute*. Native to Europe, western Asia, and northern Africa, naturalised in temperate Australia and Tasmania, locally common in waste areas on Black Mountain and Yarralumla Nursery. 'Hairy Vetch'.

4. **V. hirsuta* (L.) S. F. Gray

16. LATHYRUS L.

Slender glabrous annual with angular or flattened stems; stipules narrow linear-lanceolate, acuminate, 7-10 mm. long with divergent lower lobe; leaves with 1 pair of narrow-linear leaflets 2-5 cm. long, the terminal tendril reduced to short point or coiled or upper leaves with branched tendrils; flower 12-14 mm. long, solitary (rarely 2), on slender axillary peduncle continued above as setaceous prolongation; calyx with acuminate lobes as long as tube; standard purplish-blue with pale base; wing and keel shorter; pod linear, 3-4 cm. long, style flattened with spatulate apex. Naturalised near Hall, of Mediterranean origin. 'Vetchling'. Fig. 214.

**L. angulatus* L.

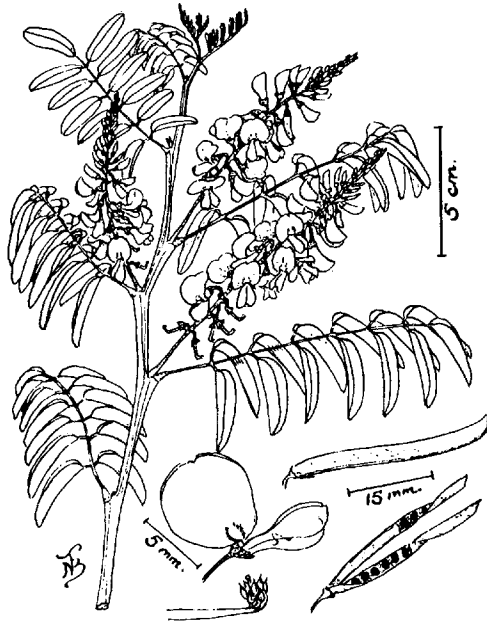
17. LOTUS L.

1. *Pubescent* perennial herb, stems stiffly erect or ascendent from woody rootstock; leaves sessile with 5 oblanceolate to cuneate-obovate leaflets, the lowest pair embracing the stem; flowers 3-8 in umbels on long axillary peduncles with 3 leaflets at the summit; calyx with lanceolate-subulate lobes; standard pink, 12-14 mm. long, wings pale, keel pale or with dark tip; pod terete, 3-5 cm. long, 2-3 mm. diameter, seeds smooth. Widespread variable species throughout Australia but not common in the A.C.T. 'Austral Trefoil'. Fig. 215. For description of variation within this species see Larsen and Zertova (1965).

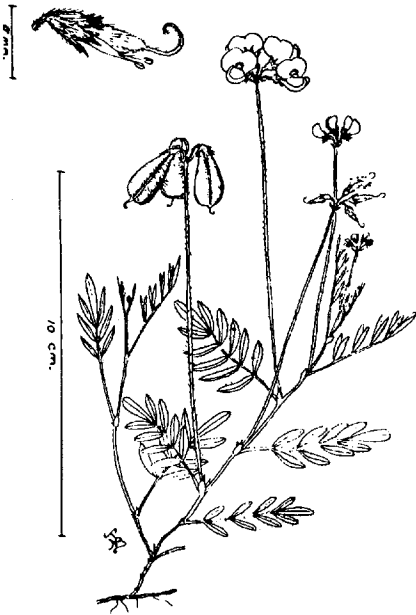
1. *L. australis* Andr.



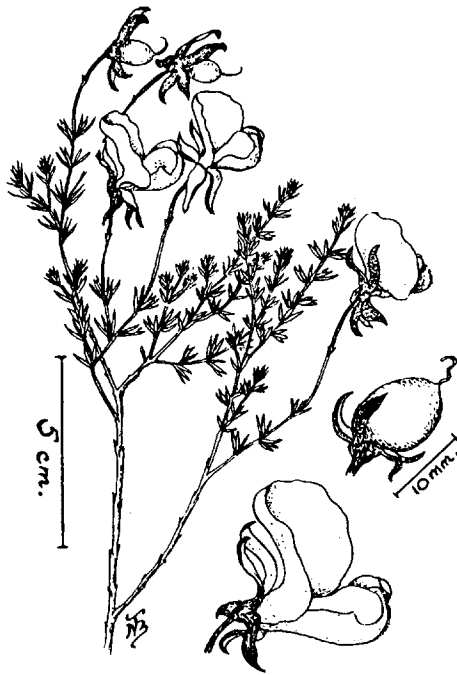
216. *Psoralea ascendens*



217. *Indigofera australis*



218. *Swainsona oroboides*



219. *Gompholobium huegelii*

1a. Weak *glabrous or sparsely hairy* perennial herb with procumbent or trailing-ascendent stems; lowest pair of leaflets smaller than upper 3 and sometimes obliquely ovate, upper 3 broadly obovate to oblanceolate; *flowers yellow*, often 2-3 on local plants (5-12 in European specimens), on long peduncles with 3 broad leafy bracts at summit; calyx 7 mm. long, glabrous or slightly hairy, subulate lobes about as long as tube, standard twice as long as calyx, keel strongly upturned; pod terete, 2-3 cm. long, 2 mm. diameter. Widespread species commonly regarded as native but it is possible both native and naturalised forms are present in Australia. In grassy places in cool habitats, not common in the A.C.T. 'Birdsfoot Trefoil'.

2. **L. corniculatus* L.

18. PSORALEA L.

1. Trailing ascendent perennial herb or subshrub, usually dark in hue with sparse more or less appressed dark hairs; leaves digitately *trifoliate*, leaflets shortly petiolulate, lanceolate or elliptical, 3-7 cm. long, with dark translucent glands; flowers in 3s along rhachis of racemes 4-9 cm. long on peduncles much longer than leaves, each triplet with small ovate *darkly hairy* and glandular bract; *calyx darkly hairy*, 3-4 mm. long, with lower lobe slightly longer and larger than others and as long as tube; petals pinkish-purple, *standard about twice as long as calyx*; pod black, rugose-wrinkled and shining, 1-seeded, indehiscent, shorter than spreading calyx. Cool shaded places in sclerophyll forest, more common at higher elevations; also eastern New South Wales to Victoria and Tasmania. Fig. 216.

1. *P. adscendens* F. Muell.

1a. Habit similar to that of above but plants smaller and more slender, almost glabrous; lowest leaves sometimes trifoliate but most *leaves with 5 narrow elliptical to narrow oblanceolate leaflets 0.5-2.5 cm. long*; racemes 1-3 cm. long on peduncles much longer than leaves, bracts with pale hairs with or without some intermixed dark ones; calyx 3 mm. long, hairs mixed pale and dark; petals bluish-pink, *little longer than calyx*; *pod pale pubescent*. More commonly associated with cold open grassy habitats than the above; also south-eastern New South Wales, Victoria, and South Australia. Note: Specimens with habit of this but with black pods as in preceding may be found and are suspected hybrids.

2. *P. parva* F. Muell.

19. INDIGOFERA L.

1. Slender often diffuse shrub to 2 metres high, branches glabrous; leaves pinnate with 4-8 pairs of *elliptical to oblong obtuse leaflets 1.5-3 cm. long* and a terminal one of similar size; petiolules and calyces with appressed brown hairs; flowers numerous in axillary racemes slightly shorter than leaves, slender pedicels subtended by minute bracts; calyx 1.5-2 mm. long, truncate or very shortly lobed; standard petal pink or purplish-pink, 7-9 mm. long, pubescent or glabrous on back, wings and keel about the same length; pod linear-terete, 2.5-3.5 cm. long, glabrous and glossy; seeds dark with wads of pithy tissue between them. Common in forest to 3500 ft elevation; widespread in eastern Australia and Tasmania. 'Australian Indigo'. Fig. 217.

1. *I. australis* Willd.

1a. Smaller shrubs with rigid stems; *leaflets obovate or cuneate, 2-5 mm. long*; *petiole commonly flattened and with prominent interstipellary glands*; flowers similar to those of preceding. Less common than above in the A.C.T.; in drier habitats from Queensland to Victoria and South Australia.

2. *I. australis* Willd. var. *signata*
F. Muell.

20. SWAINSONA Salisb. See Lee (1948)

1. Perennial herb, stipules acuminate, entire; leaves pinnate with 7-13 leaflets; *flowers in umbels or very short racemes with few flowers*; calyx pubescent with mixed dark and silvery

hairs, 3·5-6 mm. long; petals purple, standard to 14 mm. long, wings and keel petals 8-9 mm. long; *ovary densely pubescent*, style bearded on one side, flattened below summit with minute sharply bent tip; pod sparsely downy, inflated with suture intruded.

2. *Hairs of pubescence medi-fixed or excentrically attached, densely appressed and silvery*; leaflets oblanceolate or elliptical, 6-12 mm. long. Summer flowering herb of pasture and woodland areas, e.g. Coppin's Crossing, Molonglo River; also New South Wales, Victoria, and South Australia. Fig. 218.

1. *S. oroboides* (F. Muell. ex Benth.) A. Lee subsp. *sericea*
A. Lee

2a. *Hairs of pubescence basifixed, loosely spreading*; hairs of upper surface of leaflets loosely appressed and turned towards apex; leaflets narrow cuneate to narrow oblanceolate, 5-10 mm. long. In grassland areas of southern parts of the A.C.T.; also distribution similar to above but more common in central New South Wales.

2. *S. oroboides* (F. Muell. ex Benth.) A. Lee subsp. *hirsuta*
(J. M. Black) A. Lee

1a. Almost glabrous perennial herb with *sparse basifixed hairs*; stipules entire; leaves with 5-13 *very narrow elliptical leaflets*, terminal one somewhat longer (to 2·5 cm. long); *flowers in loose racemes* on slender peduncles much longer than the leaves; calyx 3-4 mm. long, sparsely hairy, lobes shorter than tube; standard to 10 mm. long, wings and keel slightly shorter; *ovary glabrous except for line of dense hairs along suture*, style bearded above and with short tuft on back at the apex; pod oblong, 7-10 mm. long, the hairy suture intruded. In woodland areas, uncommon in the A.C.T.; also Western Slopes of New South Wales and northern Victoria.

3. *S. recta* A. Lee

21. GOMPHOLOBIUM J. E. Sm. See Thompson (1961b)

Diffuse shrub to 40 cm. high, stems glabrous; leaves alternate, digitately trifoliolate on very short petioles; leaflets linear 8-15 mm. long, margins recurved or revolute, with recurved mucro; flowers solitary in upper axils or apparently terminal, with minute bracteoles at middle of peduncle; calyx glabrous, tube 1·5-2 mm. long, lobes linear-lanceolate, 7-10 mm. long with cilia on inner edge of margins, upper lobes obliquely falcate; petals golden-yellow; standard 15-20 mm. long, with broad emarginate limb, wings narrow, 12-14 mm. long; keel broadly obtuse with *conspicuously ciliate margins*; ovary glabrous, stipitate; pod inflated, subglobose, 10 mm. long, subrugose; calyx persistent with spreading (finally reflexed) lobes. In open dry sclerophyll forest at lower altitudes, e.g. Mt Jerrabomberra; also Queensland, eastern New South Wales, Victoria, and Tasmania. Fig. 219.

- G. huegelii* Benth.

22. GOODIA Salisb.

Slender shrub to 2 metres high, glabrous or sparsely hairy on young shoots; leaves alternate, trifoliolate, leaflets obovate, rounded-obtuse or apiculate, pale beneath, 1-2·5 cm. long; racemes terminal to main or lateral shoots; calyx tube glabrous but lobes tomentose within, upper lobes joined higher and acute, lower lobes acuminate; standard 12-15 mm. long (more than twice as long as calyx), yellow with purple basal mark, wing and keel petals shorter; pod on slender stalk more than twice length of calyx, flat, 1·5-3 cm. long, slightly oblique with nerve-like margins and transverse reticulation. Occasional in sclerophyll forest of mountain gullies in the A.C.T.; also from Queensland to Tasmania and South Australia. 'Golden Tips'. Fig. 220.

- G. lotifolia* Salisb.

23. **GLYCINE** Willd. See Hermann (1962)

1. Slender twiner, *pubescent with short appressed often reflexed hairs*; stipules about 1 mm. long, striations obscured by erect hairs; *leaves digitately trifoliolate*; leaflets of lower leaves broadly obovate or cuneate, obtuse, 0.6-1 cm. long, terminal leaflet longer; upper leaves with leaflets oblong lanceolate or elliptical, 2-6 cm. long; racemes on slender axillary peduncles; bracts and bracteoles narrow; *calyx densely brown-pubescent*, 4 mm. long, lobes about as long as tube; standard 7-8 mm. long, pinkish-purple with pale base, keel purple tipped; ovary pubescent; pod sparsely pubescent or glabrescent, linear. Common in woodland and forest areas; plants of open sites having shorter stems and broader leaflets than in forest specimens; also Queensland to Tasmania. 'Twining Glycine'. Fig. 221.

1. **G. clandestina** Wendl.

1a. Smaller plants than in preceding (under local conditions) with *loose spreading pubescence*; *stipules striate, not densely pubescent, 3-5 mm. long*; *leaves pinnately trifoliolate*; leaflets varying from broadly obovate or cuneate to elliptical or linear and acute; racemes axillary on long peduncles; calyx 4-5 mm. long, sparsely hairy, lobes acuminate; standard more than twice as long as calyx, purple with pale base; pod sparsely pubescent or glabrescent, linear. Not common in the A.C.T. but has been collected from dry sclerophyll areas near Canberra; also widespread in temperate Australia. 'Glycine Pea'.

2. **G. tabacina** (Labill.) Benth.

24. **KENNEDIA** Vent.

Prostrate pubescent or villous perennial; stipules broadly ovate; leaves pinnately trifoliolate; leaflets orbicular or oblong, 1.3-5 cm. long, obtuse, margins often undulate; peduncles axillary 1-2-flowered, bracts striate; calyx 5-7 mm. long, lobes about as long as tube, upper pair joined and truncately emarginate; standard petal scarlet (drying darker) with dark centre, obovate-obtuse, sharply reflexed, 1.5-2 cm. long, wings narrow, keel obtuse and slightly upturned; pod linear-terete and pubescent. Widespread throughout temperate Australia, recorded for Murrumbidgee Valley but rare in the A.C.T. 'Scarlet Runner', 'Running Postman'.

K. prostrata R.Br.

25. **LESPEDEZA** Michx.

Minor shrub with stiff slender stems, sericeous except on upper surfaces of leaflets and on petals; leaves pinnately trifoliolate; stipules setaceous, conspicuous; leaflets narrow cuneate, obtuse, mucronate, 8-14 mm. long; flowers 2-4 in small axillary clusters; lower clusters all cleistogamous with corolla and stamens reduced and minute, calyx 2.5-3 mm. long, pod almost orbicular, to 1½-2 times as long as calyx, obtuse below minute hooked style; upper clusters with normal (chasmogamous) flowers, calyx 5-6 mm. long, upper lobes shortly united, lower narrow linear-acuminate; corolla slightly longer than calyx, pale drying yellowish but standard all or partly purplish; pod shorter than calyx, ovate and narrowed above into slender style about 5 mm. long. Not common in the A.C.T.; Paddy's River area and Piallago; native to eastern Asia but introduced for pasture trials in Australia. 'Perennial Lespedeza'. Fig. 222.

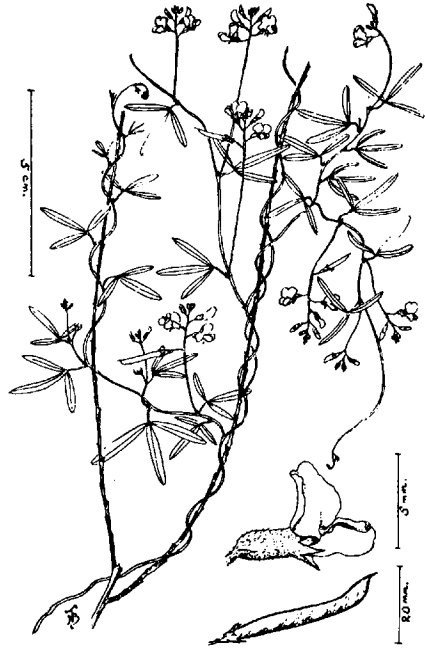
***L. juncea** (L.f.) Pers. subsp.
sericea (Thunb.) Steen.

26. **ZORNIA** J. F. Gmel. See Mohlenbrock (1961)

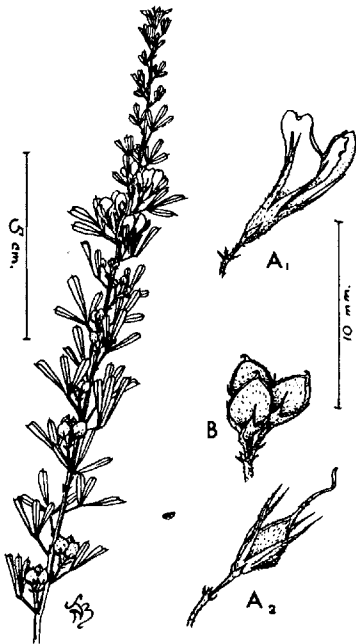
Perennial herb to 30 cm. high; leaves bifoliolate, petiole slender, leaflets 1.5-2.5 cm. long, lanceolate acuminate, slightly asymmetrical at base, glabrous and with dark glandular dots especially on lower surface; stipules striate with basal auricle below point of attachment; flowers sessile in terminal spikes, each flower enclosed by a pair of stipule-like bracts; calyx membranous, 3 mm. long, upper lobes united; lower 3 unequal, all ciliate above;



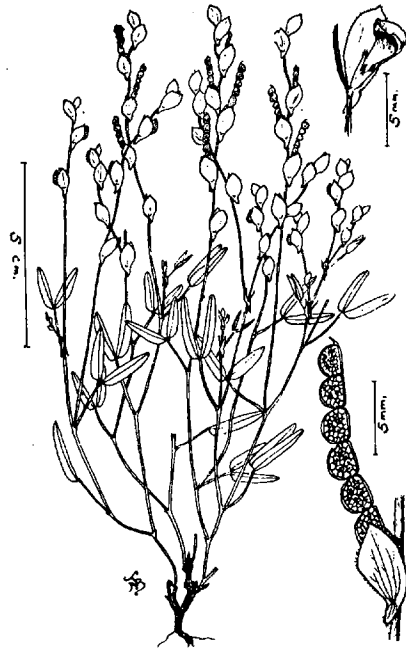
220. *Goodia lotifolia*



221. *Glycine clandestina*



222. *Lespedeza juncea* subsp.



223. *Zornia dyctiocarpa*

standard petal twice as long as calyx; pod 1.5-2.5 cm. long, constricted into several flat 1-seeded articles which are ciliate on the margins and reticulate-muricate on the sides. Grasslands in the vicinity of Canberra but rare; also Queensland and New South Wales. Fig. 223.

Z. dyctiocarpa DC.

27. DESMODIUM Desv.

Perennial, sparsely hirsute or glabrescent branches trailing ascendent; leaves pinnately trifoliolate; leaflets 1.5-4 cm. long, oblong elliptical or linear-lanceolate, scabrid pubescent; flowers small, in distant pairs along axis of slender terminal raceme; petals white tinged with red, not twice as long as hirsute calyx, standard shorter than wings and keel; pod 2-2.5 cm. long, upper suture slightly, and lower deeply, indented between flat 1-seeded articles which are covered with sticky clinging hairs. Common in grassland areas and also in woodland or dry forest. Without flowers and pods this can be confused with *Glycine clandestina* though ascendent habit is distinctive. Also from Queensland to Tasmania. 'Slender Tick Trefoil'. Fig. 224.

D. varians (Labill.) G. Don

GERANIACEAE

1. Flowers with 10 fertile stamens, solitary or in pairs on the peduncles (in A.C.T.); awn of mature mericarp without long hairs on inner face, rolled upwards but remaining attached to summit of column; seeds soon ejected; leaves palmately lobed or dissected.

1. Geranium

1a. Flowers in umbels; some staminal filaments without anthers or anthers only on filaments opposite the sepals; awn of mature mericarp with long hairs on inner face, becoming spirally twisted and finally free from the column.

2. Pedicels with glandular spur or with gland close below calyx; fertile stamens 3-8; mericarps without acuminate pungent base; seeds soon freed; leaves palmate with shallow crenate lobes.

2. Pelargonium

2a. Pedicels without glandular spur; fertile stamens 5, opposite the sepals with staminodia between; mericarps with acuminate sharply pungent base at least $\frac{1}{2}$ as long as upper portion; leaves palmately dissected, pinnately compound or pinnately dissected.

3. Erodium

1. GERANIUM L. See Carolin (1964b)

1. Flowers usually in pairs.

2. Annual herb, hirsute with shining spreading hairs mixed with pedicellate glandular ones (especially on upper parts); butt covered by numerous persistent scarious stipules from the withered basal leaves; flowering stems leafy; leaves alternate or opposite on slender petioles which are shorter on upper leaves, digitately palmatisect, segments commonly trilobed; flowers on slender peduncles, pedicels shorter than or as long as peduncles; *sepals 2 mm. long in flower*, ovate, densely villous-hirsute with spreading hairs above short glandular ones, apices acute to obtuse with blunt mucro; petals pink, *deeply emarginate*; staminal filaments not ciliate; *mericarps glabrous and transversely wrinkled-reticulate*; *seeds smooth*. Native to Europe, southern Asia, and northern Africa but naturalised in disturbed areas throughout temperate Australia and Tasmania; in the A.C.T. found in disturbed sites in swampy habitats in mountain gullies and along creeks. 'Cranesbill Geranium'.

1. *G. molle L. var. molle

2a. Perennial herbs with ascendent or decumbent stems from a thickened often turnip-

shaped (napiform) root; leaves opposite; mericarps pubescent, seeds alveolate (reticulately pitted).

3. *Stems and leaves with short appressed hairs* (with or without minute glandular hairs), *retorse on stems, petioles, peduncles and pedicels*; leaves deeply palmately 3-7-lobed, *lobes often deeply divided into three narrow segments*; sepals 3-5 mm. long, lanceolate to ovate, mucronate, with appressed and minute glandular hairs as well as more spreading longer hairs towards and along the margins; petals pink with pale bases, slightly longer than sepals, entire or slightly emarginate; seeds with irregular coarse rectangular pits (according to Carolin, 1964) but variable in A.C.T. specimens. Widespread in better rainfall areas of temperate Australia; in the A.C.T. mostly found in damp and shady habitats at lower elevations, e.g. low ground at Duntroon and at Point Hut on Murrumbidgee River.

2. **G. retrorsum** L'Hér. ex DC.

3a. *Stems and leaves with divergent bristly hairs* (with or without minute glandular ones), *spreading on all parts or somewhat recurved* but never appressed-reflexed; leaves palmately 5-7-lobed, lobes 3-lobed or -toothed in upper half; flowers similar to those of above or slightly larger, sepals with more numerous longer hairs and minute glandular ones; seeds with shallow rectangular pits which may be in longitudinal rows up the back. Widespread in temperate Australia and in New Zealand; in the A.C.T. common in damp habitats in sclerophyll forest from low to high elevations, e.g. Black Mountain, Murrumbidgee Valley, Gudgenby, Mt Coree, south through the Cotter Valley and along the ranges. 'Native Geranium'. Fig. 225.

3. **G. solanderi** Carolin var.
solanderi

1a. Flowers mostly solitary (rarely paired towards ends of late season growth); mericarps pubescent; perennial herbs.

4. Flowering stems slender and longer than basal leaves; hairs of fruiting pedicels spreading or appressed-reflexed.

5. Root thickened but not napiform; pubescence loosely or appressed-reflexed and retrorse; sepals at least twice as long as broad; seeds brown.

6. Basal leaves with *truncate lobes each with blunt or rounded secondary lobes*, petioles long; stem leaves with narrower more acute irregularly pinnatifid secondary lobes and shorter petioles; both types pubescent on both surfaces but on lower surfaces the hairs more numerous along the nerves; peduncles much shorter than pedicels *together about 2-4 cm. long* and with a pair of narrow pubescent bracteoles at the junction; *sepals oblong-lanceolate, 4-4.5 mm. long*, mucronate, with short dense pubescence and with longer reflexed hairs towards lower margins and base; petals pink to almost white, *5-7 mm. long*; *hairs on fruiting pedicels loosely reflexed and retrorse*; seeds minutely pitted. Temperate areas of south-eastern Australia, Tasmania, New Zealand; in the A.C.T. in damp habitats at high elevations or in cold mountain gullies, e.g. Mt Coree Flats, Mt Franklin, Mt Gingera.

4. **G. potentilloides** L'Hér. ex DC.
var. **potentilloides**

Note: **G. potentilloides** var. **abditum** Carolin with black and more coarsely pitted seeds may also occur at high elevations in the A.C.T.

6a. Basal leaves similar to cauline ones but their petioles to 30 cm. long and laminae to 7 cm. diameter, *the secondary lobes obtuse or acute but never truncate*; all sparsely pubescent with appressed hairs which are reflexed on stems and petioles; *peduncle plus pedicel up to 15 cm. long*, the pair of narrow bracteoles almost glabrous and placed near or about the middle (geniculate at this point in fruiting stage); *pedicels densely appressed pubescent* with reflexed hairs below calyx; *sepals lanceolate acuminate, 8-9 mm. long*, appressed pubescent without long hairs, mucro well-developed; petals pink with pale bases, *to 14 mm. long*,

obovate; seeds 3 mm. long, minutely and finely reticulately pitted. Ranges and Tablelands of eastern New South Wales from Queensland to the Victorian border; in the A.C.T. has been found growing in sphagnum under shrubs in a cold gully at the head-waters of Gibraltar Creek and in Tidbinbilla Valley.

5. *G. neglectum* Carolin

5a. Ascendent herb of smaller stature than either of above; *root napiform*; *stems, petioles, peduncles and pedicels with dense spreading hairs of varying length*; basal and stem leaves similar, the secondary lobes truncate or very obtuse; peduncle plus pedicel 2-4 cm. long, the hirsute bracteoles near the middle or, in uppermost flowers, basal (so that peduncle is scarcely developed); *sepals broadly oblong obtuse*, 5-6 mm. long, finely pubescent with scattered longer and more or less reflexed hairs especially near base; seeds dark brown, about 2 mm. long, minutely pitted. Higher elevations in south-eastern New South Wales; Mt Franklin, A.C.T., in vicinity of the ski run.

6. *G. obtusisepalum* Carolin

4a. Coarse herb with thick root and *thick butt* covered with dry old stipules and fibres of old petioles; *flowering stems very short and often reduced to peduncle plus pedicel*; basal leaves numerous, petioles more or less densely hirsute with spreading hairs as well as appressed and glandular ones; laminae digitately palmatifid, segments cuneate, the lobes cuneate and obtusely or acutely trilobed; *peduncle plus pedicel shorter than petioles, densely hirsute with antrorsely appressed hairs* (rarely spreading); sepals 6-8 mm. long, lanceolate acuminate, villous with antrorsely appressed or loose hairs; petals deep pink, obovate, 8-12 mm. long; seeds dark brown, finely reticulate rather than pitted. At high elevations in south-eastern New South Wales and Victoria; in the A.C.T. occurs on upper slopes, as on Mt Ginini, or in cold valleys such as the Upper Cotter and Gudgenby.

7. *G. antrorsum* Carolin

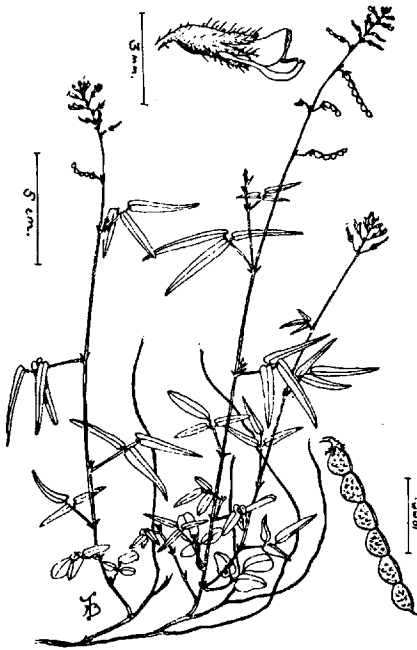
2. PELARGONIUM L'Hér. *See Carolin (1961)*

1. Perennial herb with erect or ascendent stems, pubescent or villous with minute glandular hairs underneath the longer simple ones; stipules scarious, deltoid, more or less villous and ciliate; leaves mostly ovate (from orbicular to cordate), 5-7-lobed, palmately veined, margins crenate; umbels 4-12-flowered, bracts similar to stipules; *nectary spur about as long as calyx*; sepals shortly united, 4-7 mm. long; lobes lanceolate-elliptical, *villous with soft acicular hairs* above glandular ones; margins ciliate; petals pink, from slightly longer to twice as long as sepals; staminal filaments 10, 7-8 (rarely 6) with anthers; mericarps villous, 2.5 mm. long; rostrum (beak) 12-14 mm. long, villous. Commonly found near rock outcrops, growing in crevices or in shallow soil, from lower river valleys to high elevations though not common in the A.C.T.; also south-eastern Queensland, New South Wales, Victoria, Tasmania, South Australia, Western Australia and Tasmania. Fig. 226.

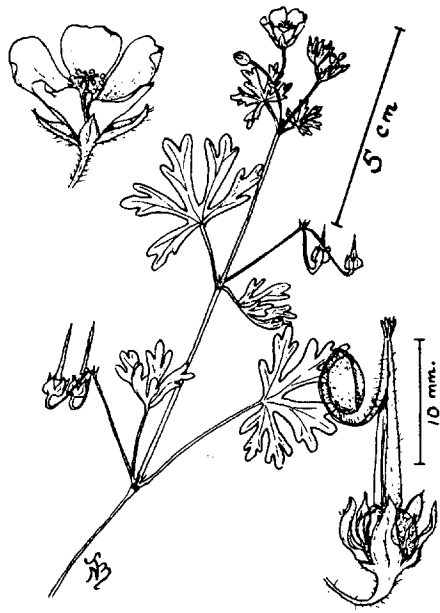
1. *P. australe* Willd.

1a. Short-lived perennial herb, stems with short stiff simple hairs with minute glandular pubescence underneath; stipules scarious, glabrous or scabrid but margins ciliate; pedicels of flowers very short; *nectary spur very short*; sepals 2-4 mm. long; shortly united, lobes ovate or ovate-lanceolate, *with scattered short stiff hairs* and minute glandular pubescence, *margins not ciliate*; petals pink, to 1½ times as long as sepals; *3-5 of the 10 staminal filaments with anthers*; mericarp villous, 2 mm. long; rostrum 8-10 mm. long, villous. In grassy sward near rocks, more common at lower elevations than the preceding; also south-eastern Queensland to Tasmania and New Zealand.

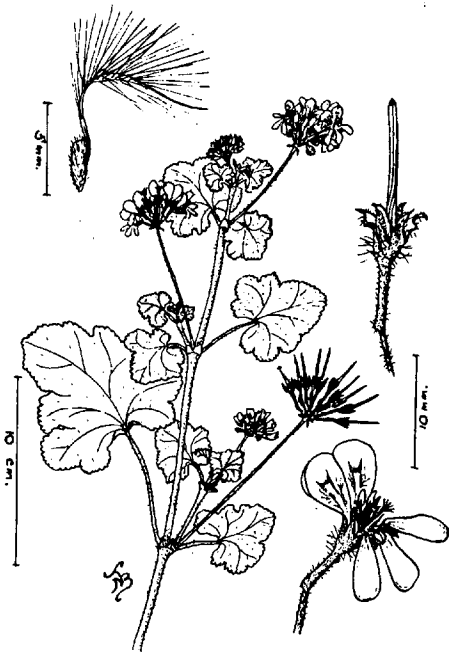
2. *P. inodorum* Willd.



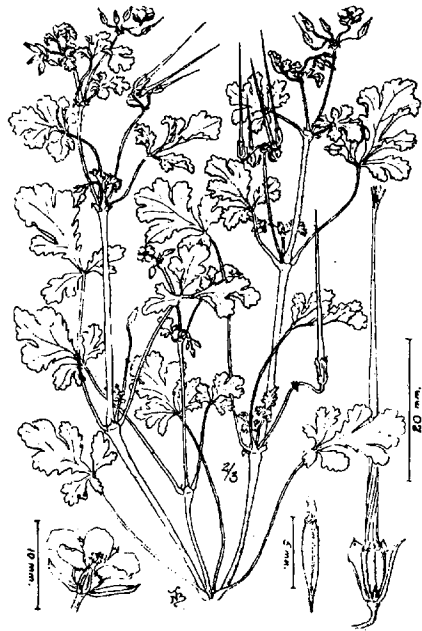
224. *Desmodium varians*



225. *Geranium solanderi*



226. *Pelargonium australe*



227. *Erodium crinitum*

3. **ERODIUM** L'Hér. See *Carolin* (1958, 1963)

1. Leaves pinnately compound; hairs of stems and petioles spreading; rostrum of fruit 3-4 cm. long; petals pink.

2. Prostrate annual herb (fruits erect), with long white and also glandular hairs; leaves irregularly pinnate, leaflets ovate-oblong in outline, *incised-toothed* but not deeply lobed; *stipules* scarious, *obtuse*; peduncles longer than leaves, bracts similar to stipules; umbels of 5-9 pedicellate flowers; sepals 5-7 mm. long, oblong-lanceolate, densely glandular-pubescent; petals pink-purple, slightly longer than sepals; filaments of fertile stamens sometimes with tooth on either side at base; mericarps 6 mm. long, villous, with hairs brushed to one side, apical pit with surrounding furrow and conspicuous *short glandular hairs*; rostrum hairy. Native to Europe and Mediterranean, widely naturalised in southern and eastern Australia and Tasmania, common in cultivated and disturbed habitats in the A.C.T. 'Musky Crowfoot'.

1. ***E. moschatum** (L.) L'Hér.

2a. Prostrate annual or biennial herb similar to above but glandular hairs minute and inconspicuous or abundant as in preceding; *leaflets deeply pinnatisect*; *stipules* scarious, *acute or acuminate*; peduncles about as long as leaves, bracts similar to stipules; umbels 2-7-flowered; sepals 3-5-5 mm. long, oblong-lanceolate, villous (or less often glandular-villous), commonly with 1 or 2 long hairs on the apical mucro; petals pink, longer than sepals; filaments of fertile stamens without teeth at base though broadened below; mericarps 5-6 mm. long, hairy, *pit glabrous* and surrounded by furrow. Native to Europe, southern Asia, and northern Africa; widely naturalised in southern and eastern Australia and more common in the A.C.T. than the preceding. 'Common Crowfoot'.

2. ***E. cicutarium** (L.) L'Hér.

1a. Leaves deeply lobed to pinnatisect, more or less ovate in outline; hairs of stems and petioles often reflexed; rostrum of fruit more than 4 cm. long; petals blue or mauve-pink.

3. Sepals (in flowers) densely glandular-villous with long simple hairs towards margins and base; stipules glabrous except for marginal cilia. Annuals.

4. Procumbent herb, hirsute with stiff hairs which are reflexed below the nodes; upper parts finely glandular-pubescent; basal leaves petiolate, pinnatisect, lobes crenate or obtusely toothed; upper leaves sessile, ovate in outline with acutely toothed lobes; peduncles longer than leaves; bracts scarious; umbels 2-4-flowered; sepals oblong to elliptical, 6-7 mm. long (to 10 mm. in fruit); petals mauve-pink drying blue, slightly longer than sepals; mericarp 7-8 mm. long, hairy, *pit surrounded by shallow obscure furrow, the margin with short hairs which are also present in pit*; rostrum 4-5-8 cm. long. Native to Mediterranean area but naturalised in Queensland, South Australia, Victoria, and New South Wales; a weed of cultivated and disturbed ground in the A.C.T. (see Guittonneau, 1966).

3. ***E. brachycarpum** (Godr.) Thell.

4a. Procumbent or ascendent herb, sparsely hirsute below, glandular-pubescent above; basal leaves petiolate, pinnatisect, lobes crenately toothed; uppermost leaves sessile; peduncles finally longer than leaves; umbels 1-3-flowered; sepals similar to those of preceding but enlarging to 12-14 mm. in fruit; petals mauve-pink drying blue, slightly longer than sepals; mericarp 9-10 mm. long, hairy, *pit glabrous with 2 concentric furrows below it*; rostrum more than 8 cm. long. Native to Mediterranean but widely naturalised in temperate Australia; locally common in the A.C.T., found on cultivated or disturbed ground. 'Long Storksbill'.

4. ***E. botrys** (Cav.) Bertol.

3a. *Perennial herb*, erect or ascendent, stems sparsely hirsute with stiff spreading hairs with shorter or minute ones underneath, not glandular-pubescent on upper parts; leaves palmately

dissected with 3 segments of which the terminal one is larger and often 3-lobed, margins crenate or serrate; lower petioles longer than their leaves; upper leaves shortly petiolate; *stipules pubescent with ciliate margins*; peduncles not longer than leaves, bracts scarious, pubescent; umbels 2-5-flowered; sepals lanceolate to oblong, 5 mm. long in flower (to 10 mm. in fruit), *minutely glandular-pubescent* and with longer simple hairs specially along the nerves, margins ciliate; petals blue, longer than sepals; mericarps hairy, 6-8 mm. long, *pit glabrous, rather shallow and with shallow furrow below*; rostrum 4.5-6.5 mm. long. Native to southern and eastern Australia (Western Australia to Queensland); grows in open areas in woodland or grassy places or occurring as weed of disturbed ground. 'Native Crowfoot'. Fig. 227.

5. *E. crinitum* Carolin

OXALIDACEAE

OXALIS L. *See Michael (1965)*

1. Slender stoloniferous perennial herb; stolons sparsely hispid; erect flowering stems hirsute-sericeous; leaves digitately trifoliolate, slender petioles commonly less than 3 cm. long; leaflets sessile, cuneate, 5-15 mm. long, deeply emarginate with wide sinus between obtuse lobes, hairy when young, later hairs mostly on nerves of lower surface and on margins; *flowers in axillary umbels*, sometimes reduced to single flower; sepals hairy or glabrous except at apex; *petals yellow*, 2-3 times as long as sepals; capsule densely pubescent, more or less quadrangular but narrowed above into persistent styles; seeds escaping through longitudinal slits. A cosmopolitan species represented by at least two local forms. In one the hairy sepals are 4-5 mm. long, petals 9-12 mm. with marginal hairs and the seeds have transverse pits in longitudinal series. In the other the sepals are almost glabrous except at apex and 2-3 mm. long, petals 6-7 mm. long, seeds transversely rugose. Common in woodland and forest habitats but also persistent in pastures and a garden weed; widespread in Australia except in tropical areas, and in Tasmania. 'Yellow Wood Sorrel'. Fig. 228.

1. *O. corniculata* L. sens. lat.

1a. Rhizomatous perennial herb, rhizome jointed and with prominent leaf scars; *leaves all basal*; petioles slender, to 30 cm. long in large plants, appressed-sericeous at first, later glabrescent; leaves digitately trifoliolate, leaflets broadly obcordate-cuneate, 10-20 mm. long, deeply emarginate with narrow U-shaped sinus, sericeous when young, later sparsely hairy, pale below and with scattered callosities near upper margin; umbels finally longer than leaves, *4-10 flowered*; pedicels and calyces sericeous; sepals 3-5 mm. long with orange or dark callosities near apices; *petals pink drying purple, sericeous on back where exposed before opening*, about 3-4 times as long as calyx. A garden escape now naturalised in some places near settlements. Of South American origin and one of the species erroneously called 'Shamrock' by horticulturalists.

2. **O. articulata* Sav. sens. lat.

LINACEAE

LINUM L.

1. Erect perennial herb to 1 metre high, stems slender from thick root; leaves alternate, narrow linear, glabrous, 1-2 cm. long; flowers pedicellate in terminal panicles; *sepals 3-4 mm. long, keeled by thickened midrib*, otherwise nerveless or with faint laterals at base, ovate-acuminate with scarious margins; petals white or pale blue, about twice as long as sepals; *styles united to middle or higher*; capsule subglobose but broader than long, splitting into 10 pointed valves; seeds 2 per cell, very flat, smooth, light brown. Common in mountain

gullies in grassy places among shrubs or in open sites at high elevations; widespread in temperate Australia and Tasmania. 'Wild Flax'. Fig. 229.

1. *L. marginate* A. Cunn. ex Planch.

1a. *Annual* herb with simple erect stem or branched from base; leaves linear-lanceolate or narrow elliptical, 2-3 cm. long; flowers in terminal panicles; *sepals 5-7 mm. long, the midrib prominent between lateral nerves about 1/2 as long; styles free*; capsule similar to that of preceding but larger and 6-8 mm. in diameter; seeds similar. Grown under cultivation in Duntroon area some years ago and now semi-naturalised. 'Linseed Flax'.

2. **L. usitatissimum* L.

ZYGOPHYLLACEAE

TRIBULUS L.

Prostrate herb, villous with long bristles and short crimped hairs when young, more or less glabrescent on older parts; leaves opposite, the pairs of unequal size, pari-pinnate; leaflets oblong with oblique base, upper surface villous on midrib and margin, lower surface more evenly villous; flowers pedunculate, solitary at base (appearing axillary) of lateral shoot in axil of smaller leaf of each pair; sepals 3-4 mm. long, villous; petals yellow, slightly longer than sepals; fruit separating into 5 wedge-shaped rugose carpels each with a pair of slender spines on the back and a smaller pair near the base, sparsely pubescent. This form is less hairy than plants from inland arid areas. It may be introduced and not truly native. A.C.T. specimens have been collected at Uriarra Crossing and in the University grounds; distribution elsewhere in Australia is dependent on the relationship between hairy and less hairy forms. 'Caltrop'. Fig. 230.

- T. terrestris* L.

RUTACEAE

1. Petals more or less united in a tubular corolla; leaves opposite, stellate-tomentose.

1. *Correa*

1a. Petals free.

2. Petals white or yellow, calyx truncate or shortly lobed; plants with silvery or rusty scales.

2. *Phebalium*

2a. Petals pink to white.

3. Leaves alternate; petals 5.

4. Staminal filaments glabrous.

2. *Phebalium*

4a. Staminal filaments hairy.

5. Anthers without appendages.

3. *Eriostemon*

5a. Anthers tipped with hairy appendages.

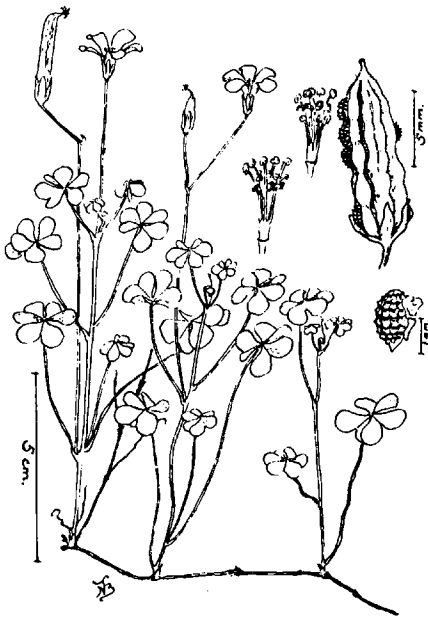
4. *Crowea*

3a. Leaves opposite; petals 4, stamens 8.

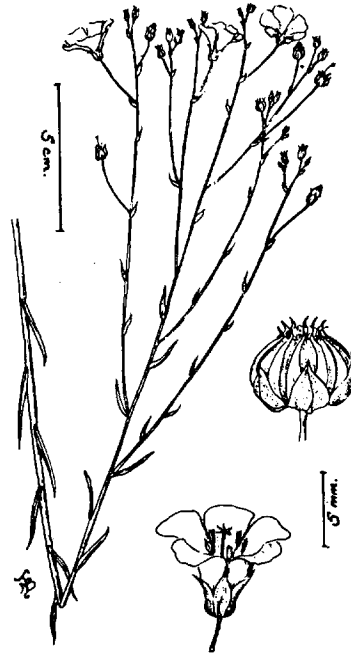
5. *Boronia*

1. *CORREA* Andr. *See Wilson (1961)*

1. Stellate tomentose shrub to 1 metre high; leaves 1.5-3.5 cm. long, cordate to ovate-lanceolate, commonly more or less recurved or reflexed. Flowers solitary in upper axils; calyx cupular, stellate-tomentose, truncate or almost so, 4-5 mm. long; *corolla 25-30 mm. long, red with pale portion distally or pale green throughout*, 4-lobed, petals remaining coherent until after flowering; *4 of the staminal filaments broadened below*, anthers exserted. Common along Murrumbidgee and Molonglo Valleys, usually among shrubs of lower



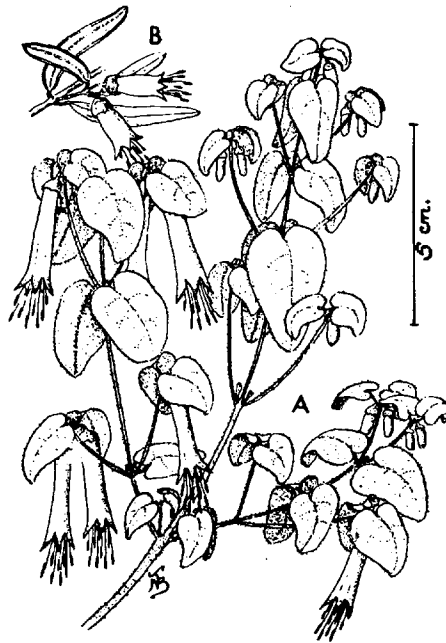
228. *Oxalis corniculata*



229. *Linum marginale*



230. *Tribulus terrestris*



231. A. *Correa reflexa*
B. *Correa lawrenciana*

slopes or on banks of streams; widespread in better rainfall areas of south-eastern Australia from Queensland border through New South Wales, Victoria to South Australia, also Tasmania. 'Correa'. Fig. 231A.

1. *C. reflexa* (Labill.) Vent. var.
reflexa

1a. Shrub to 1 metre high but more spreading than above; young shoots, undersurfaces of leaves, and flowers stellate-tomentose but older parts glabrescent; leaves ovate to oblong, 2-5 cm. long, flat or margins revolute, almost or quite glabrous above, marked by pellucid glands; flowers solitary in upper axils; calyx truncate with short acute lobes, 4-5 mm. long, tomentum brown or rust-red; *petals creamy or reddish, 15-25 mm. long*, coherent to late stage; *all staminal filaments filiform to base*, anthers exerted. Distributed from south-eastern New South Wales to Tasmania; in the A.C.T. only known from Blackfellow's Gap and Bimberi Range. Fig. 231B.

2. *C. lawrenciana* W. J. Hook. var.
lawrenciana

2. **PHEBALIUM** Vent.

1. Shrub with *branchlets conspicuously tuberculate and glabrous or very sparsely stellate hairy*; leaves shortly petiolate, cuneate or obovate, 4-8 mm. long, sometimes subcrenulate above, glabrous but paler beneath; flowers in small terminal sessile umbels or clusters; *petals pink*, valvate with inturned apices; stamens 10, filaments glabrous; *ovary glabrous*, carpels 5, style attached low in centre. Uncommon in the A.C.T., growing to 1 metre high in parts of the Cotter Valley though apparently the same as a low undershrub form found on exposed ridges of Blue Range; also at high elevations in south-eastern New South Wales.

1. *P. lamprophyllum* (F. Muell.)
Benth.

1a. Shrub to less than 1 metre high, *branchlets tomentose with fringed peltate scales* (rusty-red on young shoots), later glabrescent; leaves oblong to cuneate or orbicular, rounded-obtuse, 3-12 mm. long, margins recurved, tomentose when young with branched hairs and scales which are more numerous on undersurface, later glabrescent or scabrid on upper surface; flowers in terminal clusters, shortly pedicellate; pedicels, calyx, and outer face of petals clothed with peltate scales (commonly rust-red or with radiating red lines); calyx minute, truncate with minute lobes; *petals yellow within, 2.5-4 mm. long*, narrowed into papillose apiculum which may be reflexed; filaments glabrous; *ovary covered with deeply fringed scales*, carpels 5, style slender and attached low. More common among rocks or in shrub communities in grassy areas at high elevations but also on shallow soil in gullies at lower levels; south-eastern New South Wales and eastern Victoria. Fig. 232.

2. *P. ozothamnoides* F. Muell.

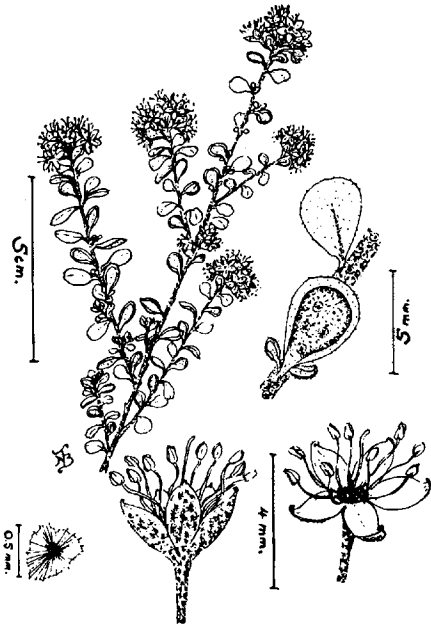
3. **ERIOSTEMON** J. E. Sm.

Shrub with erect branches; leaves linear or elliptical to oblanceolate, with conspicuous midrib, greyish-green with numerous glands (also present on stems and calyces); flowers in few-flowered axillary umbels; calyx very short, 5-lobed; petals ovate, pink, 7-8 mm. long; stamens 10, filaments flattened below and ciliate, upper part narrow and long-ciliate; anthers minutely apiculate. In shallow soils on slopes of mountain gullies or among rocks but uncommon in the A.C.T. though collected in Kangaroo Creek area; also in eastern New South Wales and Victoria. 'Waxflower'. Fig. 233.

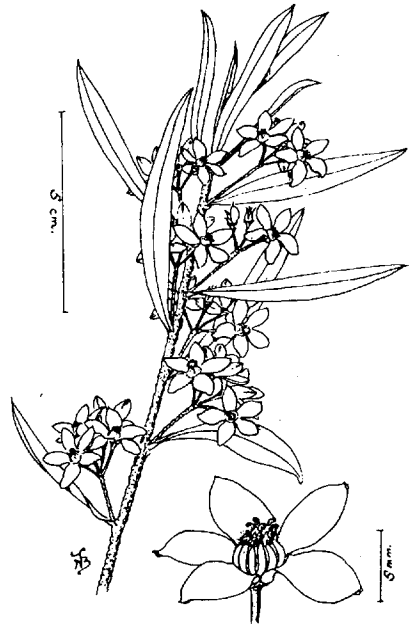
E. myoporoides DC. subsp.
myoporoides

4. **CROWEA** J. E. Sm.

Shrub to 60 cm. high; leaves linear to narrow lanceolate, 1-2 cm. long, margins recurved,



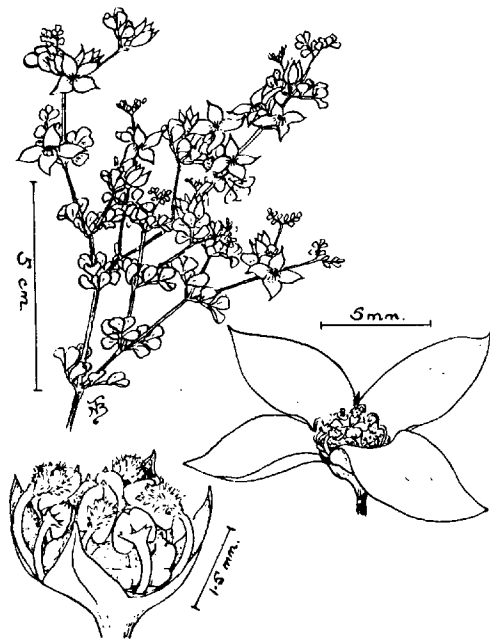
232. *Phebalium ozothamnoides*



233. *Eriostemon myoporoides*



234. *Crowea exalata*



235. *Boronia algida*

midrib prominent on undersurface; flowers terminal or in upper axils on a short axillary shoot with few leaves; calyx lobes minute; petals pale to deep pink, 8-12 mm. long; staminal filaments flattened, ciliate; anthers with conspicuous hairy appendage at the apex. Not yet recorded from the A.C.T. but grows near the Murrumbidgee in the vicinity of Ginninderra Gorge, on slopes with shallow soils; also in Victoria. Fig. 234.

C. exalata F. Muell.

5. **BORONIA** J. E. Sm.

1. Low or small shrub to 0.5 metres high, branches pubescent when young; leaves opposite, *pinnate* with 5 (rarely 7) leaflets of which lowest pair lies against stem; leaflets obovate to cuneate, glabrous, 3-7 mm. long, terminal one often the smallest; flowers solitary or few in upper axils; sepals ovate-acuminate, 2-3 mm. long, minutely ciliolate; *petals valvate*, white to deep pink, broadly lanceolate to ovate; *filaments glabrous*, anthers obtuse, minutely apiculate, alternate ones papillose. Common in dry sclerophyll forest at elevations above 3000 ft or in shaded gullies; south-eastern New South Wales and north-eastern Victoria. Fig. 235.

1. *B. algida* F. Muell.

1a. Low subshrub or perennial herb with woody rootstock or rhizome; stem simple, erect, or decumbent, with two rows of hairs on opposite sides in grooves from decurrent leaves; *leaves simple*, linear-lanceolate, 1-2 cm. long, glandular on both surfaces; flowers pedicellate in upper axils, pedicels with pair of minute bracteoles; sepals ovate, 1-2 mm. long; *petals imbricate*, pink, glabrous but with numerous glands on outer face, 3-4 mm. long; *staminal filaments hairy*; anthers apiculate; ovary glabrous, style hairy. In forest habitats on upper slopes of ranges but uncommon in the A.C.T.; also New South Wales, Victoria, South Australia, and Tasmania.

2. *B. nana* W. J. Hook. var.
hyssopifolia Melville

TREMANDRACEAE

TETRATHECA J. E. Sm.

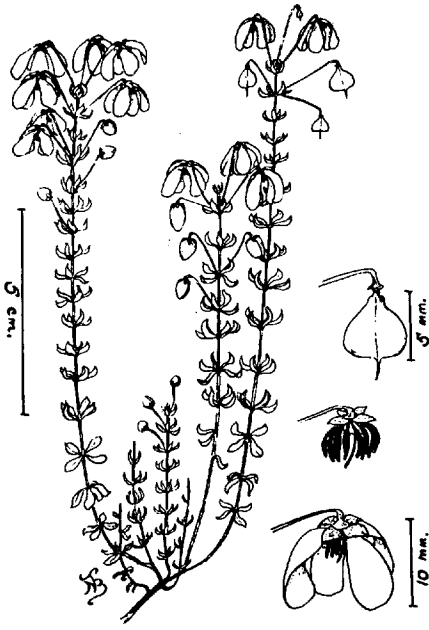
Decumbent-ascending undershrub to 15 cm. high; stems wiry, more or less hirsute with curled hairs with tubercle bases, later glabrescent-tuberculate, commonly with coarser hairs at nodes; leaves 4-6 per whorl, 3-7 mm. long, oblanceolate to elliptical, margins flat to revolute, apex up-curved; upper surface almost glabrous or scabrid towards margins and along middle line; lower papillose with few hairs on midrib, sometimes a few glandular hairs near apex; peduncles and outer faces of sepals glabrous; sepals 1.5-2 mm. long, ovate, obtuse to shortly acuminate, inner face subglabrous or with marginal and subapical hairs; petals deep pink to pinkish-purple; 8-10 mm. long, oblanceolate; anthers dark purple, 2 mm. long, pale around apical pores; pistil purple, style glabrous or with few hairs at base or higher; ovary wholly glabrous or with scattered glandular hairs or densely sericeous with scattered dark glandular hairs; capsule cuneate to obcordate, truncate to emarginate, 5.5-6.5 mm. long, glabrous; 2 ovules per loculus. Apparently an unnamed species but common in the A.C.T. in dry sclerophyll habitats especially in the mountains. 'Pink Eye'. Fig. 236.

T. aff. *ericifolia* J. E. Sm.

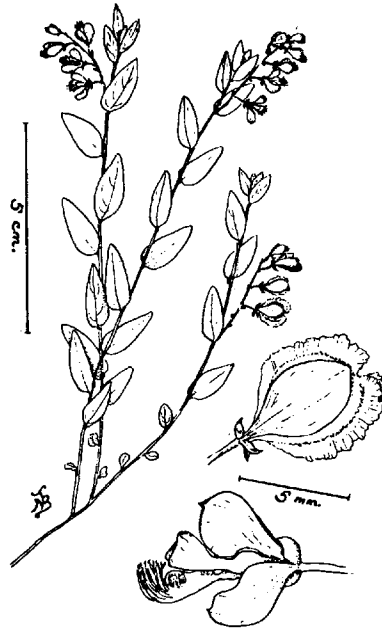
POLYGALACEAE

1. Keel petal crested; seeds glabrous or pilose with short dense hairs in a rounded or ovate capsule.

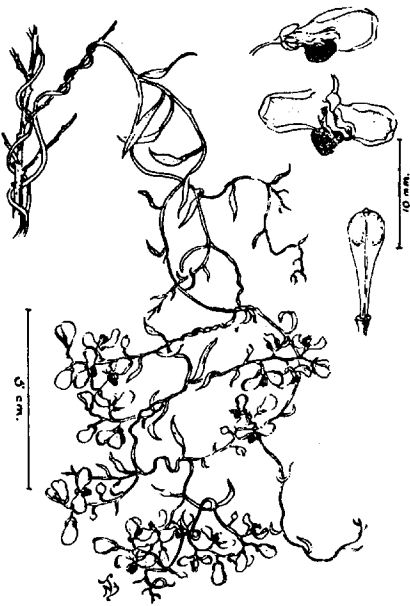
1. *Polygala*



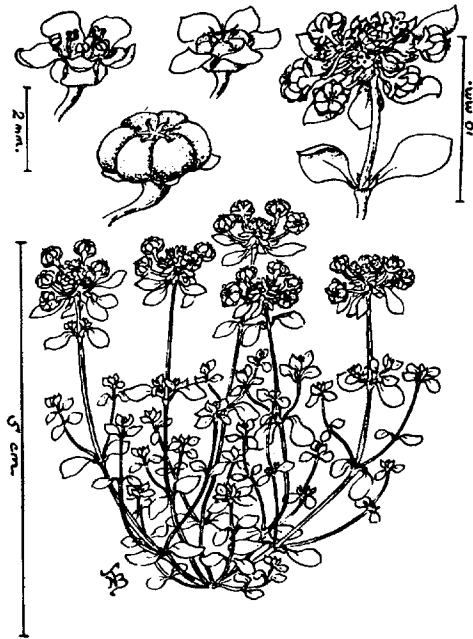
236. *Tetratheca* sp.



237. *Polygala veronica*



238. *Comesperma volubile*



239. *Poranthera microphylla*

1a. Keel petal not crested, seed hairy with tuft of long hairs; capsule cuneate with narrow base.

2. *Comesperma*

1. *POLYGALA* L.

Small perennial herb, stems wiry, puberulent with minute curved hairs, leaves alternate, ovate to broadly elliptical, flat or margins recurved, reticulately veined, pubescent on margins and midrib of lower surface, 8-18 mm. long, obtuse; flowers few in short racemes from upper axils, pedicels pubescent; outer sepals linear lanceolate, sparsely pubescent, 3 mm. long; inner sepals petaloid, dark purple, 3-4 times as long as outer; petals purple or purple-tipped, lateral ones as long as inner sepals, keel longer and with fringed crest; sepals persistent in fruit; capsule 7-9 mm. long, much flattened, almost circular, valves winged; seeds pilose, caruncle 3-lobed, lobes more than half as long as the seed. Minor species of grassy places and pastures at lower and intermediate altitudes; also in Queensland, New South Wales, and Victoria but not common. Close to *P. japonica* Hoult., a species extending from Japan to New Guinea but differing from our species in the broader, more obtuse, less strongly nervate inner sepals which are shorter than the mature capsule. 'Milkwort'. Fig. 237.

P. veronicea F. Muell.

2. *COMESPERMA* Labill.

1. Shrubs to 60 cm. high with stiff erect leafy stems; flowers deep pink or pinkish-purple.

2. Older stems marked with leaf scars; roots aromatic when crushed; leaves crowded, flat, rather thick, oblong or oblanceolate, *obtuse*, 5-12 mm. long, very shortly petiolate; flowers in *short corymbose racemes* terminal to current growth but later overtopped by new shoots; outer sepals oblong, 2 mm. long; inner at least 3 times as long as outer; petals slightly shorter than inner sepals, keel with a broad greenish or dark tip; capsule with narrow base (enclosing hairs of seeds) below the cuneate winged or emarginate upper portion. A common species in sphagnum swamps and damp habitats at higher elevations, e.g. Snowy Flats (Mt Gingera); also distributed from Queensland to Tasmania. 'Purple Milkwort'.

1. *C. retusum* Labill.

2a. More slender and less bushy in habit than the preceding species; leaves linear to elliptical or oblanceolate, 8-14 mm. long, *margins recurved except above where inturred to the acute and slender recurved apiculate apex; racemes slender, elongating to 10 cm. in fruit*; flowers similar to those of preceding; capsule less truncate at apex. In dry forest habitats in Kowen area near Queanbeyan but not common in the A.C.T.; also distributed from Queensland to Tasmania.

2. *C. ericinum* DC.

1a. *Slender glabrous twiner*; leaves distant, linear or broader on bases of young shoots, sometimes almost lacking; flowers in axillary racemes; *outer sepals dark blue*, 2 mm. long, ovate, obtuse; *inner sepals blue*, petaloid, broadly ovate above narrow claw, 5-6 mm. long; lateral petals narrow, slightly shorter than inner sepals, pale blue or with purple spot near apex, ciliate towards base; keel shorter, dark coloured above with pale margin; capsule narrowly cuneate, not winged above; seed villous on margins and with basal tuft of fine webby hairs. On shrubs in sclerophyll forests at medium and lower altitudes; widespread in temperate areas of southern and south-eastern Australia, also Tasmania. 'Love Creeper'. Fig. 238.

3. *C. volubile* Labill.

EUPHORBIACEAE

1. Herbs.

2. Plants with small white or pinkish flowers in a corymbose panicle.

1. *Poranthera*

2a. Flowers enclosed in perianth-like cyathium in which each male flower consists of a single stamen and the single female flower is later extruded on a short curved pedicel.

2. *Euphorbia*

1a. Shrubs.

3. Male flowers pedicellate, plants glabrous or with simple hairs.

4. Leaves alternate; styles slender, spreading or falling in the capsule stage.

3. *Phyllanthus*

4a. Leaves in small clusters of half whorls of 3 (varying 2-5) at alternate nodes; capsule with erect rigid persistent styles.

4. *Micranthemum*

3a. Male flowers sessile; plants with stellate hairs.

5. Leaves narrow; stamens united in a column; flowers axillary.

5. *Bertya*

5a. Leaves broad; stamens crowded but not united in a column; flowers in spikes or clustered terminally.

6. *Adriana*

1. *PORANTHERA* Rudge

Small glabrous grey-green herb; leaves opposite or alternate, spatulate or oblanceolate, 5-10 mm. long, obtuse, paler beneath, minutely stipulate; flowers in short terminal racemes, slender pedicels subtended by narrow leafy bracts; calyx petaloid, white, sepals about 1.5 mm. long; petals minute; in male flowers stamens 5, dehiscing by apical pores; female flowers slightly larger, stamens lacking, the 3 styles each deeply bifid, ovary depressed globular; capsule about 2 mm. diameter. A common species in woodland and forest sites at all elevations; New South Wales, Victoria, South Australia, Tasmania, and New Zealand. Fig. 239.

P. microphylla Brongn.

2. *EUPHORBIA* L.

1. *Prostrate* glabrous herb, *stems commonly red*; leaves opposite, distichous, 5-7 mm. long, oblong with oblique base, petiole minute; involucre axillary, shortly pedunculate, with pink appendages bearing red glands; capsule glabrous, 1.5-2 mm. long and less in diameter. A common weed of cultivated or disturbed ground, summer growing. Widespread in Australia, also in Tasmania. 'Caustic Weed'.

1. *E. drummondii* Boiss.

1a. Erect plants.

2. Glabrous annual herb with pale green or reddish stems; *leaves obovate*, thin, 5-15 mm. long on slender petioles; upper part of plant formed of an umbellate corymbose inflorescence with sessile ovate leafy bracts; involucre axillary, sessile or almost so, glands lunate with slender green or yellow horns; *capsule about 2 mm. long*. Common weed in gardens and on waste ground, native to Europe and temperate Asia; naturalised in settled districts throughout southern and eastern Australia and Tasmania. Very susceptible to an orange-spored stem rust on stems and leaves. 'Petty Spurge'. Fig. 240.

2. **E. peplus* L.

2a. Erect herb with more or less glaucous stems to 50 cm. high; *lower leaves alternate, linear with recurved or revolute margins*, 2-4 cm. long, commonly reflexed at flowering time; upper leaves opposite, to twice as long as lower, broadly linear or wider at base, obtuse,

paler beneath, margins flat; inflorescence cymose with large leafy ovate bracts subtending the involucre whose appendages have short blunt horns; capsule at least 10 mm. in diameter and about the same length, surface rough when dry. Commonly growing in colonies in shade of trees in old gardens or near old settlements or near water in disturbed areas; of Mediterranean origin, naturalised in many settled districts of Australia and Tasmania. 'Caper Spurge'.

3. **E. lathyris* L.

3. *PHYLLANTHUS* L.

Small pubescent dioecious shrub to 60 cm. high with numerous erect slender but woody stems; leaves oblanceolate to cuneate, 4-12 mm. long, apices slightly recurved, midrib prominent on undersurface, petiole and stipules minute; flowers axillary; males on slender peduncles in small greenish or creamy clusters, calyx about 1 mm. long; female solitary on stouter peduncles, green, calyx 2-3 mm. long but larger about base of ripe capsule; capsule 3-4 mm. in diameter, depressed globular, pubescent, the persistent styles fragile and spreading. Common in dry sclerophyll forest sites on shallow soil, e.g. Black Mountain, slopes above Murrumbidgee, lower slopes of ranges; south-eastern Australia. 'Thyme Spurge'. Fig. 241.

P. thymoides (J. Muell.) J. Muell.

4. *MICRANTHEUM* Desf.

Erect glabrous or almost glabrous shrub with leaves in threes (2-5) at alternate nodes thus forming half whorls; leaves elliptical to oblanceolate, acute or mucronate, 6-14 mm. long, slightly concave, shortly petiolate; flowers in upper axils; males pedunculate, calyx with 3 outer sepals and 3 petaloid inner ones nearly twice as long; stamens 6-9; female flowers on short stout peduncles, slightly larger than males, ovary with 3 simple styles. In scrub along river or creek banks or in mountain gullies or on ridges, not very common in the A.C.T.; south-eastern Queensland, New South Wales, Victoria, and Tasmania. Fig. 242.

M. hexandrum J. D. Hook.

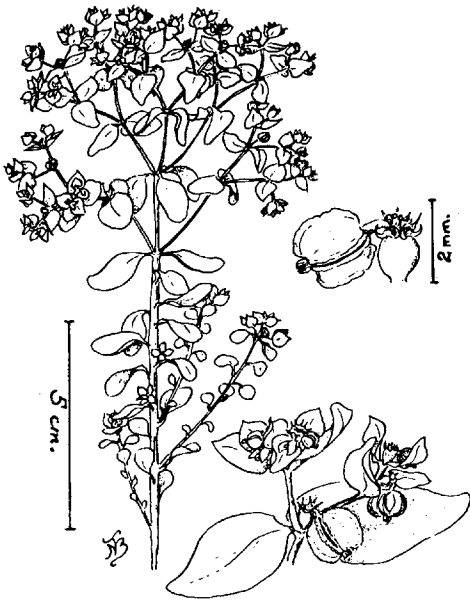
5. *BERTYA* Planch.

Erect monoecious shrub to 2 metres high, branches pubescent with stellate hairs, later glabrescent; leaves alternate, narrow linear, 1-2 cm. long, margins revolute, lower surface stellate tomentose; flowers in upper axils; males shortly pedunculate with a calyx-like series of stellate-tomentose bracts, calyx proper of 5 petaloid segments (drying rusty-brown) about 3 mm. long, oblong, thinly stellate tomentose on back and margins, anthers numerous, subsessile on short column; females with similar bracts and calyx, ovary villous, styles deeply bifid; capsule stellate-tomentose, ovoid, 7-9 mm. long. In scrub on river banks, e.g. Pine Island, Murrumbidgee River; also eastern New South Wales and Tasmania. Fig. 243.

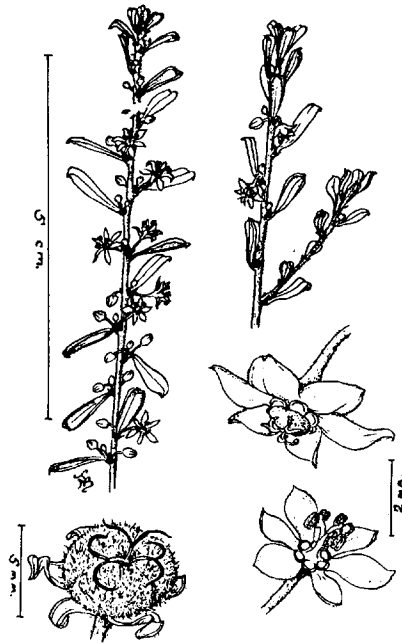
B. rosmarinifolia (A. Cunn.)
Planch.

6. *ADRIANA* Gaudich.

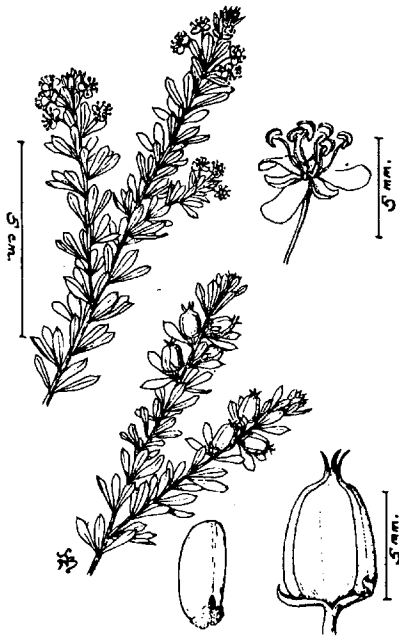
Dioecious shrub 1-2 metres high, branches puberulous with minute grey or yellowish stellate tomentum; leaves 5-18 cm. long on slender petioles to 6 cm. long, 3-lobed or the uppermost ovate to ovate-lanceolate, lobes acuminate-acute with middle lobes ovate, margins coarsely and irregularly sinuate, with scattered stellate hairs above but lower surface pale with dense minute tomentum; petioles with double stipular gland at base; male flowers in narrow spicate terminal panicle, clustered in axils of broad bracts with stipular glands, calyx lobes valvate, broadly ovate, 3-5 mm. long, tomentose on back, apex narrow, stamens numerous, filaments short, anthers with papillose appendages; female flowers in short terminal spikes, styles papillose, free and bifid for half their length; capsule



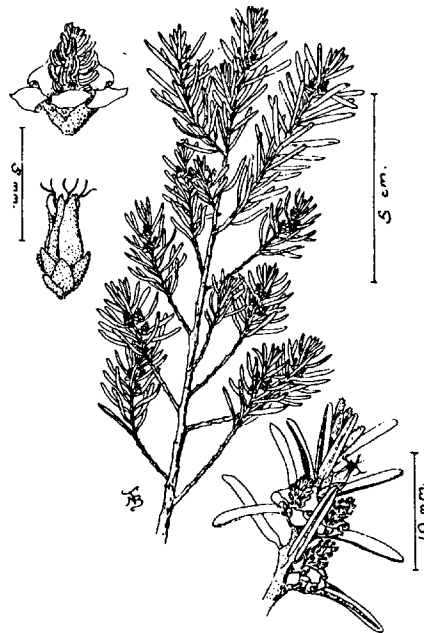
240. *Euphorbia peplus*



241. *Phyllanthus thymoides*



242. *Micranthemum hexandrum*



243. *Bertya rosmarinifolia*

ovoid-globular, shorter than persistent styles, stellate-tomentose, muricate. In scrub along banks of Murrumbidgee River; also eastern Australia. Fig. 244.

A. *acerifolia* W. J. Hook.

CALLITRICHACEAE

CALLITRICHE L. See Mason (1959)

Weak glabrous herb forming floating mats in shallow water; stems and leaves minutely scabrid (fresh); adventitious roots at most nodes; leaves opposite, obovate (appearing more spatulate when dry), rounded-obtuse, obscurely 3-5-nerved (more evident when dry), paler beneath, 5-10 mm. long; flowers minute, between a pair of bracteoles in the upper axils, unisexual, calyx and corolla lacking; male with single stamen on slender filament; female with 2-styled ovary; capsule almost round, 1-1.5 mm. long, 4-seeded, winged and shortly stipitate. In shallow water courses, e.g. Botanic Gardens, Black Mountain but not common or often overlooked; also Europe, Asia, Australia, New Caledonia, and New Zealand and probably introduced in North America. 'Water Starwort'. Fig. 245.

*C. *stagnalis* Scop.

STACKHOUSIACEAE

STACKHOUSIA J. E. Sm.

1. Perennial glabrous herb with few or numerous stems from rhizome; leaves alternate or irregularly opposite, linear or narrow lanceolate; flower spikes terminal, at first dense but elongated in fruit; flowers subtended by acuminate bracts with saccate base and about as long as calyx; *calyx 2-3 mm. long, acute lobes as long as tube; corolla creamy-white, petals loosely coherent in slender tube 7-8 mm. long, free parts 4-5 mm. long and linear-obtuse*; fruit of 3 nutlets 2 mm. in diameter, their surfaces reticulate, calyx and staminal filaments persistent. Very common and widespread in woodland and forest habitats at all altitudes; South Australia to Queensland, also Tasmania. 'Candles'. Fig. 246.

1. S. *monogyna* Labill.

1a. Habit similar to that of preceding but flowers mostly paired along rhachis of slender terminal racemes with minute bracts and bracteoles shorter than the minute pedicels; *calyx 1 mm. long, lobes as long as tube; corolla yellow, tube 3-3.5 mm. long, lobes slender acuminate and 2 mm. long*; 3 nutlets about 1 mm. diameter, their surfaces reticulate. Widespread and variable species, uncommon locally, collected near Bull's Head, also Blue Range. General distribution not given as more than one species may be included under the name.

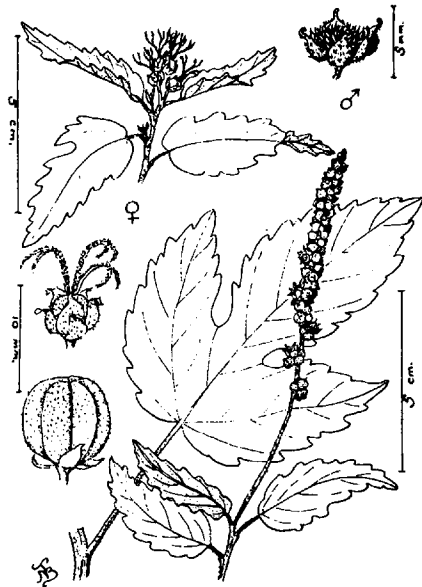
2. S. *viminea* J. E. Sm. sens. lat.

SAPINDACEAE

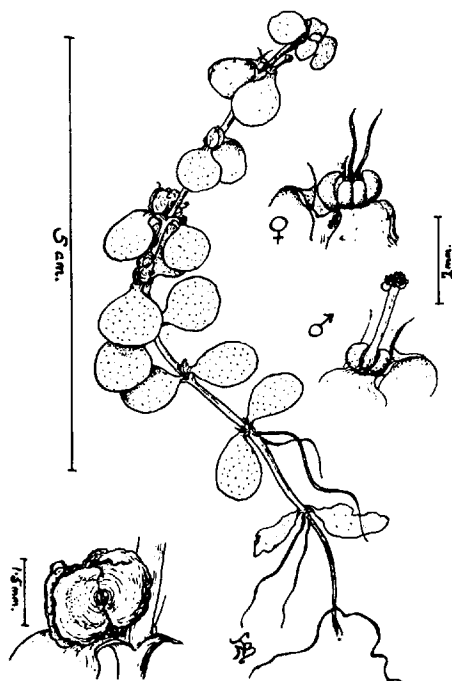
DODONAEA Mill.

1. Dioecious shrub to 2 metres high, slightly viscid or resinous on young stems, leaves, and flowers; leaves in local plants varying from broadly oblanceolate and 3-5 cm. long to cuneate and 2-3 cm. long; apices obtuse to truncate-apiculate or almost 3-toothed; flowers in short terminal or axillary inflorescences, pedicellate, calyx of 3-5 greenish sepals, petals lacking; male flowers with sepals spreading below 8 stamens with very short filaments; female flowers with sepals erect around viscid ovary, style 3-4-lobed; capsule 3-4-celled, 8-10 mm. long, each cell with thin papery wing from base to summit; seeds black. Common in dry sclerophyll habitats below 2500 ft. A widespread and variable species forms of which occur in many parts of southern and eastern Australia. Local form matches the figure of *D. asplenifolia* Rudge in *Trans. Linn. Soc.*, XI: 297 t. 20 (1815). 'Hop Bush'. Fig. 247.

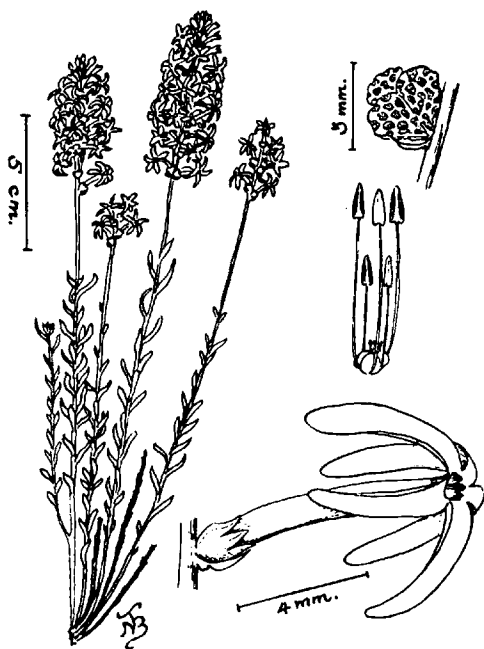
1. D. *viscosa* Jacq. sens. lat.



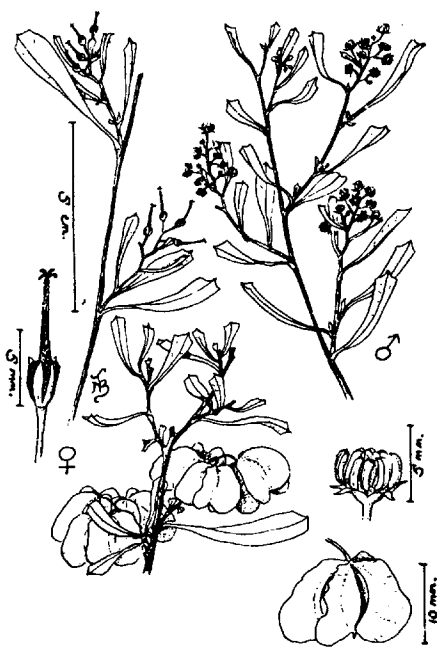
244. *Adriana acerifolia*



245. *Callitriche stagnalis*



246. *Stackhousia monogyna*



247. *Dodonaea viscosa*

1a. Differing from above in narrow more or less linear leaves 2-8 cm. long and 2-3 mm. wide; female flowers less viscid, appearing papillose or hairy; capsule slightly smaller than in preceding. In scrub along river valleys but not common in the A.C.T.; widespread in drier areas of Australia and possibly only a variety of the preceding.

2. **D. attenuata** A. Cunn.

Note: **D. procumbens** F. Muell., a small prostrate shrub forming mats, the leaves cuneate with toothed apices and 1-1.5 cm. long; male flowers with ciliate sepals and red stamens; females with style 4-6 times as long as calyx; capsule 5-7 mm. long, angles thick but not distinctly winged; has been collected in grassland near Michelago. It may occur in similar habitats in the A.C.T. but has not been recorded.

RHAMNACEAE

1. Leaves alternate, stems without axillary thorns.

2. Petals recurved or lacking, not hooded over anthers which are borne on well-developed filaments; flower pedicels subtended by bracts which are not imbricate and which fall early.

1. **Pomaderris**

2a. Petals minute and hooded over anthers; flowers subtended by imbricate brown bracts.

2. **Cryptandra**

1a. Leaves (when present) opposite; stems with opposite divaricate axillary thorns.

3. **Discaria**

1. **POMADERRIS** Labill. See Wakefield (1951b, 1953)

1. Inflorescence terminal to main shoot or to laterals from upper axils; leaves not linear (except **P. pallida**) or narrow oblong, at least some being more than 2 cm. long.

2. Tall shrub to more than 4 metres high, floccose-hoary with *tomentum of stipitate stellate hairs* on stems and undersurfaces of leaves; leaves irregularly and minutely toothed, broadly lanceolate or elliptical, 5-12 cm. long, rugose-reticulate on almost glabrous upper surfaces; flowers greenish, about 3 mm. long, in *large terminal pyramidal panicles longer than upper leaves*; petals lacking; *capsule immersed in tube for about 1/3 of its length*, almost glabrous or with few scattered stellate hairs; the calyx tube densely stellate. A common shrub along margins of rivers and creeks and in wetter parts of mountain gullies; also New South Wales, Victoria, and South Australia.

1. **P. aspera** Sieb. ex DC.

Note: Differs from **P. apetala** Labill. of Tasmania, the Grampians in Victoria, and of New Zealand, in having stipitate looser tomentum on stems and undersides of leaves and in the less immersed capsule.

2a. Flowers in corymbose panicles or dense clusters.

3. Leaf margins entire, lateral nerves failing to reach margins and often curved away from them.

4. Leaves glabrous on upper surface or with few hairs along sunken nerves; petals present.

5. Shrub to 3 metres high, branches and undersurfaces of leaves with *dense close tomentum with scattered long simple hairs* (especially on nerves); *leaves 4-10 cm. long*, broadly elliptical or ovate; petals spatulate with narrow claw and broad concave triangular limb; *capsule immersed about 1/2 its length*, subglabrous above the stellate-villous calyx tube. In dry sclerophyll gullies on Black Mountain; New South Wales, Victoria, and Tasmania.

2. **P. affinis** N. A. Wakefield

Note: May not be distinct at the species level from **P. sieberana** N. A. Wakefield which differs in its dense very minute and close tomentum and fewer long hairs; branches of

inflorescence not villous with long hairs, petals with cordate or cordate-auriculate limb.

5a. Shrub to 2 metres high, stems and undersurfaces of leaves with *tomentum of tangled branched hairs partly hidden by numerous soft simple ones*; leaves 2-3.5 cm. long, elliptical-lanceolate; petals with narrow claw passing into elliptical or obovate limb; *capsule immersed more than $\frac{1}{2}$ its length and more densely villous than calyx tube*. In dry sclerophyll habitats but extending to higher elevations than *P. affinis*; New South Wales and Victoria.

3. *P. andromedifolia* A. Cunn.

Note: Specimens from Gibraltar Valley resemble above species in leaf venation and petals but tomentum is densely stellate with very few simple hairs, leaves are conspicuously petiolate with acute not obtuse bases, bracts persistent to the fruiting stage and hairy with tangled tomentum to the margins. May be a distinct species but in characters lies between *P. andromedifolia* and *P. betulina*.

4a. Leaves velvety hairy on upper surfaces, with simple hairs or hairs in spreading clusters of 2-5 and appearing more or less stellate; bracts persistent to flowering stage or later; under surfaces of leaves with dense tangled tomentum and with longer simple hairs along main veins.

6. Shrub to 2 metres high; *leaves broadly oval or obovate, 1.5-3.5 cm. long, rounded-obtuse, hairs of upper surfaces mostly simple*; petals narrow spatulate; capsule immersed for $\frac{1}{2}$ or little more than $\frac{1}{2}$ its length, villous with ferruginous hairs whose colour makes them more conspicuous than the paler ones of the villous calyx tube. Uncommon, collected from Paddy's River area between Cotter and Tidbinbilla; also New South Wales and Victoria.

4. *P. subcapitata* N. A. Wakefield

6a. Shrub to 2 metres (?); *leaves oblong or elliptical, 0.8-1.8 cm. long, acute or obtuse, hairs of upper surfaces short and mostly in stellate clusters of 3-5*; petals lacking; capsule similar to that of preceding but the longer villous hairs pale and more numerous than on calyx tube. Cotter-Paddy's River area; New South Wales and Victoria. The type specimen (Cambage—N.S.W. 5651) was collected near the Murrumbidgee-Cotter, River junction.

5. *P. pallida* N. A. Wakefield

3a. Leaf margins minutely and irregularly undulate-toothed, the nerves reaching the margins and commonly terminating in minute hair tufts; bracts persistent around sessile flowers.

7. Shrub 2-3 metres high, *stems and undersurfaces of leaves densely villous with long simple hairs above loose and tangled tomentum, upper surfaces shortly hirsute with erect simple hairs*; leaves almost orbicular or oval to oblong-ovate, 1-5 cm. long, more or less plicate between sunken (above) or prominent (below) nerves, margins flat with the hair tufts at ends of nerves conspicuous especially on young leaves; petals sometimes present; capsule immersed to less than $\frac{1}{2}$ its length, villous with ferruginous hairs above villous calyx tube. In dry sclerophyll habitats, e.g. Molonglo Gorge, Cotter and Murrumbidgee Valleys, Brindabella Range; also New South Wales and Victoria. Fig. 248.

6. *P. eriocephala* N. A. Wakefield

7a. Shrub to 3 metres high, *stems and undersurfaces of leaves densely stellate-tomentose, upper surfaces of leaves shortly hirsute to glabrous*; leaves lanceolate elliptical to elliptical-oblong; 1.5-3 cm. long, nerves of upper surfaces deeply sunken, margins more or less recurved; petals lacking; capsule immersed for more than $\frac{1}{2}$ its length and with ferruginous villous hairs above villous calyx tube. Dry sclerophyll habitats, e.g. Jerrabomberra near Queanbeyan; New South Wales and Victoria. (See note under *P. andromedifolia*.)

7. *P. betulina* A. Cunn. ex W. J. Hook.

1a. Flowers in short axillary and terminal panicles or terminating short axillary shoots, usually shorter than subtending leaves; leaves linear to narrow oblong, all less than 1.5 cm.

long, margins recurved or revolute; petals lacking; bracts persistent at least until flowering stage.

8. Shrub to 2 metres high, *branches villous with long spreading hairs above shorter branched ones; leaves linear and closely revolute, upper surfaces scabrid* with short tubercle-based hairs; capsule immersed for less than half its length, densely but shortly villous like the calyx tube. Uncommon in the A.C.T., has been collected on Mt Coree; New South Wales.

8. **P. phyllicifolia** Lodd. ex Link
var. **ericoides** Maiden et Betche

8a. Shrub to 3 metres high, *branches stellate-tomentose*, later glabrescent; *leaves narrow linear with recurved margins, upper surface with scattered stellate hairs*, lower with pale tomentum of tangled branched hairs; pedicels and calyces stellate hairy; *capsule glabrous, not immersed*, broader above and truncate with depressed centre. Scrub near river banks or on slopes in dry sclerophyll gullies, common in Molonglo Gorge; New South Wales and Victoria.

9. **P. angustifolia** N. A. Wakefield

2. CRYPTANDRA J. E. Sm.

1. Imbricate bracts minute and covering only the base of the calyx tube or the pedicel.

2. Low shrub with slender erect or ascendent branches, younger parts hoary with substellate hairs, smaller lateral branchlets sometimes ending in spines; leaves oblong to oblanceolate, shortly petiolate, 4-6 mm. long, rather thick, margins flat or recurved, glabrous apart from few stellate hairs on midrib of lower surface; flowers axillary, forming leafy spikes; bracts ciliate; *calyx tube tomentose* with more or less stellate hairs and about 2-2½ times as long as shortly acuminate lobes which are glabrous within though papillose on margins and with prominent median ridge; petals at top of tube, minute and hooded over minute dark stamens. Common in dry sclerophyll forest habitats at lower elevations; widespread throughout temperate Australia (and Tasmania?). Fig. 249.

1a. **C. amara** J. E. Sm. var. **longiflora** F. Muell. ex Maiden et Betche

Note: True **C. amara** with calyx tube about the same length as the lobes may also occur in the A.C.T.

2a. Differing from the preceding in the non-spinose branchlets; *leaves 2-4 mm. long with closely revolute margins*; flowers crowded at ends of branches; bracts loosely imbricate around pedicel below obconical base of *villous calyx tube* which is about as long as the villous triangular lobes. Black Mountain; also Queensland, New South Wales, and South Australia.

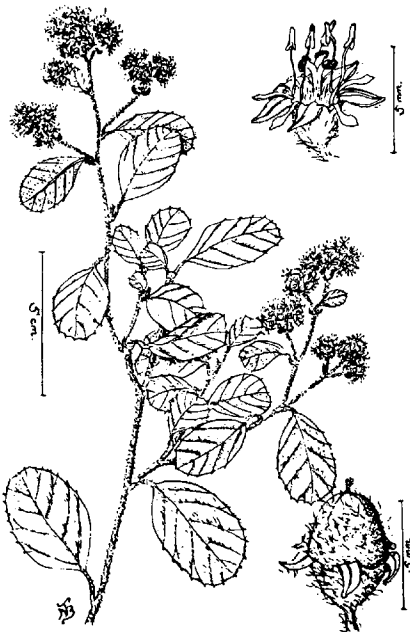
1b. **C. amara** J. E. Sm. var. **floribunda** Maiden et Betche

1a. Low shrub, young branches loosely villous, older soon glabrescent, general habit more open and diffuse than in above; leaves 2-7 mm. long, *margins revolute* but the villous hairs of midrib generally evident; flowers clustered at ends of branches; *bracts conspicuous and covering glabrous calyx tube* which is about as long as the *silky villous acuminate lobes*. In scrub of river banks at lower elevations; also New South Wales, Victoria, and South Australia.

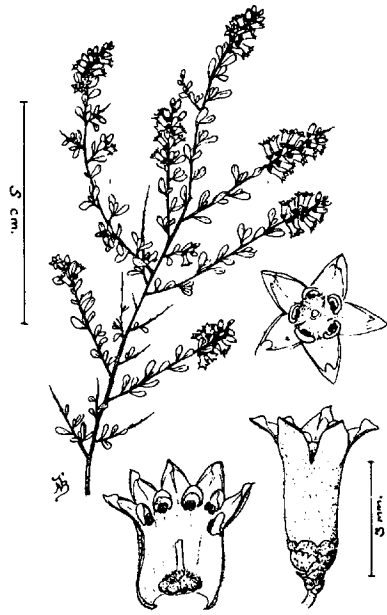
2. **C. propinqua** A. Cunn. ex Fenzl

3. DISCARIA W. J. Hook. See Willis (1955)

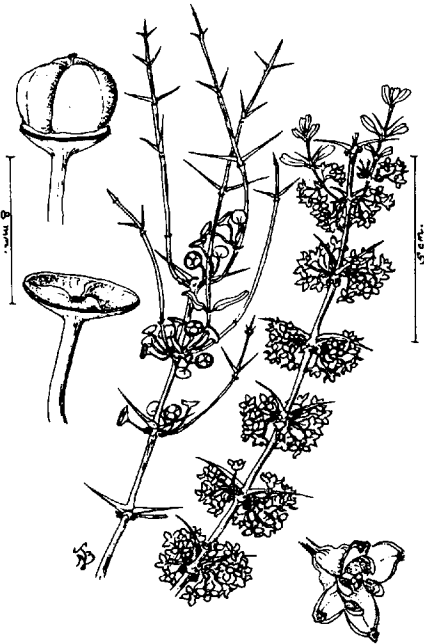
Densely branched shrub to 1 metre high, stems pubescent, usually with divaricate axillary spines 1-2.5 cm. long; leaves oblong, oblanceolate or cuneate, 10-14 mm. long, shortly petiolate, sometimes absent or only on young shoots; flowers pedicellate in short axillary



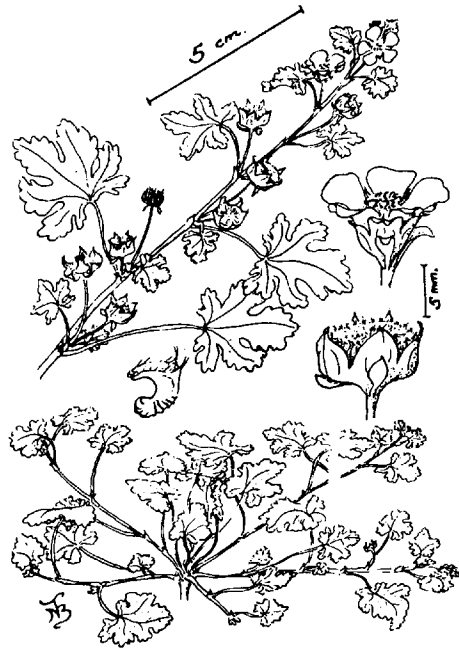
248. *Pomaderris eriocephala*



249. *Cryptandra amara* var.



250. *Discaria pubescens*



251. *Modiola caroliniana*

racemes, rhachis hairy, pedicels subtended by hairy bracts and bracteoles; calyx tube short, the white or creamy lobes spreading to 5 mm. diameter, glabrous except for papillose apex and inner apical ridge; petals minute, hooded but not covering stamens; capsule 3-lobed, free upper part later falling leaving disc-like base plus spreading calyx tube. Occasional on slopes or near water courses in dry sclerophyll habitats; also Queensland (Darling Downs), eastern New South Wales, Victoria, and Tasmania. 'Australian Anchor Plant'. Fig. 250.

D. pubescens (Brongn.) Druce

MALVACEAE

1. Leaves palmate or palmatifid; flowers bisexual; involucre of 3 bracteoles present.
2. Corolla orange or brick-red; cells of the fruit with short horns at the upper angle and each containing 2 seeds.

1. **Modiola**

- 2a. Corolla white or pale pink; cells of the fruit rounded on the back and forming 1-seeded nutlets.

2. **Malva**

- 1a. Leaves not palmate or palmatifid; flowers unisexual; bracteoles absent.

3. **Gynatrix**

1. **MODIOLA** Moench

Perennial herb, stems prostrate, rooting at nodes and with scattered simple and stellate hairs; leaves suborbicular or broadly ovate, sometimes deeply 3-5-lobed, margins irregularly crenate, 1.5-3.5 cm. long, petiolate; flowers axillary, pedunculate, 3 elliptical-lanceolate ciliate bracteoles forming an epicalyx; calyx campanulate, 5 mm. long, hairs mostly simple, lobes ovate-obtuse and about as long as tube; corolla slightly longer than calyx; fruit 7-9 mm. in diameter, villous on top and sides along the ridges of the cells which split to release seeds. Common weed in gardens and lawns and in waste places; native to temperate and warm areas in America but naturalised in temperate parts of Australia and in Tasmania. 'Red-flower Mallow'. Fig. 251.

***M. caroliniana** (L.) G. Don

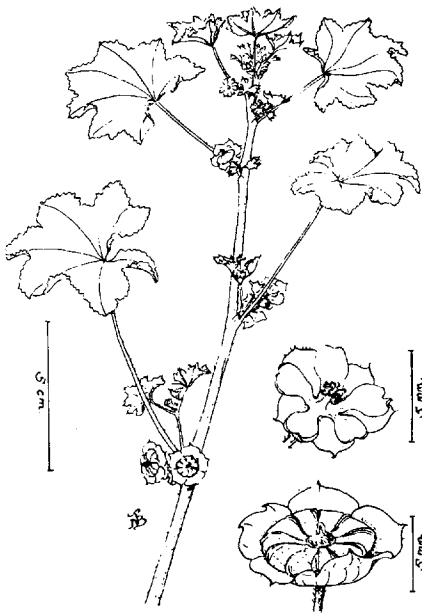
2. **MALVA** L.

1. Annual or biennial herb with prostrate stems or central stem erect, stellate hairy; leaves orbicular or cordate-reniform, 2-5 cm. in diameter, margins crenate and with 5 shallow lobes, petioles long and slender; stipules ovate; flowers 2 or more in very short axillary racemes lengthening in fruit; epicalyx of 3 narrow lanceolate bracteoles; calyx lobed to middle, not much enlarged later; corolla turning pink when dry, *petals 9-12 mm. long, claws bearded, 2-3 times longer than calyx*; fruit of numerous 1-seeded nutlets around sunken centre, 6-7 mm. in diameter, greenish-brown; *nutlets hairy on rounded backs, thin sides without ridges*. Of European origin but a common weed of gardens and cultivated ground in the A.C.T.; naturalised in Tasmania and in some areas of temperate Australia. 'Mallow'.

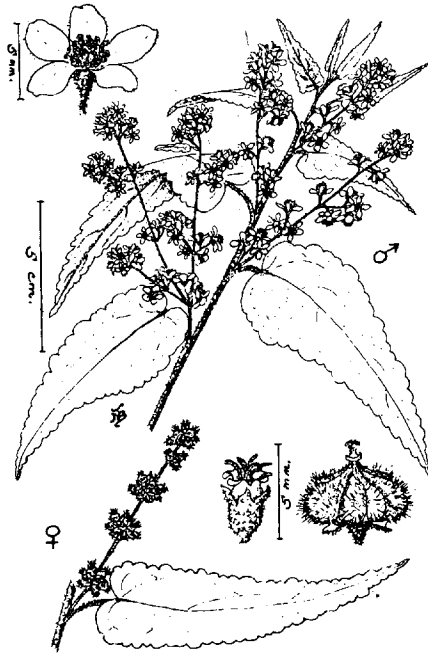
1. ***M. neglecta** Wallr.

1a. Erect or decumbent herb less stellate hairy than above; leaves more distinctly 5-7-lobed, margins regularly crenate, hairs of petioles commonly restricted to upper surface; flowers in axillary clusters, pedicels not much elongated in fruit; epicalyx of narrow linear bracteoles; calyx 3-3.5 mm. long, lobes broadly ovate, acute, enlarged to about 13-15 mm. diameter in fruit; *corolla little longer than calyx; petal claws glabrous; nutlets with raised almost winged ridges and with radiating ridges on thin sides*. In similar sites to the preceding; of Mediterranean origin but widely naturalised in temperate Australia and in Tasmania. 'Small-flower Mallow'. Fig. 252.

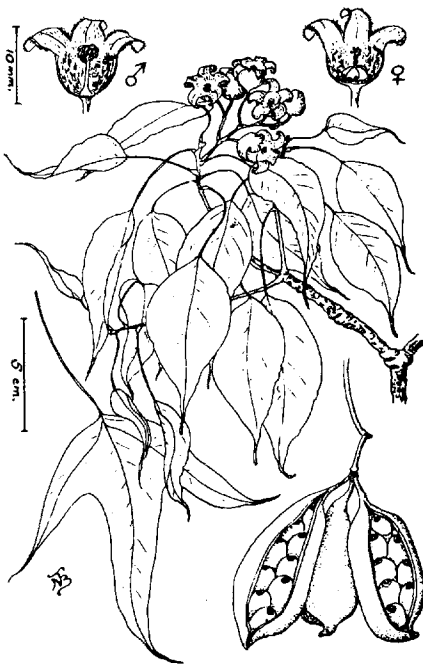
2. ***M. parviflora** L.



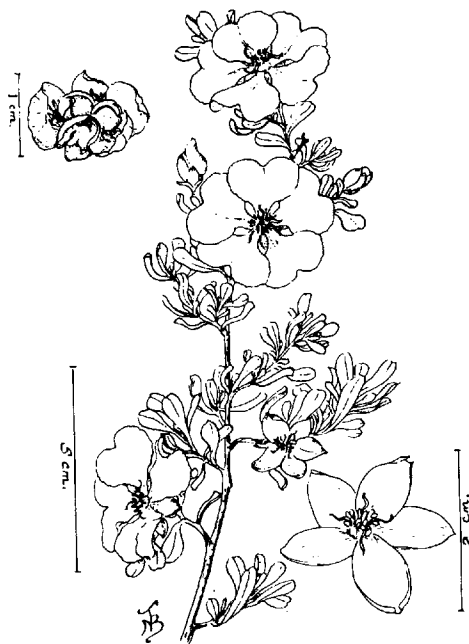
252. *Malva parviflora*



253. *Gynatrix pulchella*



254. *Brachychiton populneum*



255. *Hibbertia obtusifolia*

3. GYNATRIX Alef. See Melville (1967)

Diffuse dioecious shrub to 3 metres high, stellate hairy; leaves narrowly cordate-lanceolate with shallow sinus at base, acuminate, margins crenate, 4-10 cm. long, sparsely stellate above, coarsely so on undersurface, midrib, and petiole; male flowers paniculate in upper axils, calyx broadly campanulate, 2.5-3 mm. long, lobed to near middle, loosely stellate hairy; petals white or creamy, about twice as long as calyx, glabrous except where covered by calyx, ciliate on apices; females clustered in spike-like panicles, pedicels very short; calyx narrower than in males; petals narrow and little longer than calyx; ovary densely hairy; styles 4-5, free above; capsules densely hirsute with simple hairs, cells opening above, later freed and exposing smooth sides. Shrub of gully scrubs, usually near water or banks of creeks; also New South Wales, Victoria, and Tasmania. 'Hempbush'. Fig. 253.

G. pulchella (Willd.) Alef.

STERCULIACEAE

BRACHYCHITON Schott et Endl.

Tree with bushy top of glossy leaves and thick light grey trunk; leaves glabrous, alternate, reticulately veined, ovate, entire or 3-lobed, apices slender acuminate, 6-12 cm. long; flowers unisexual in small panicles; calyx 8-12 mm. long, cupular-campanulate, lobed to about the middle, lobes recurved; male flowers with filaments fused in central column topped by globular mass of anthers; females with 5 carpels on gynophore surrounded by reduced stamens, styles twisted together; carpels spreading in fruit and stipitate, each splitting on one side to expose golden-brown closely packed seeds, 5-8 cm. long. On rocky slopes and low hills below 2500 ft; common in such sites in the A.C.T.; also Queensland, New South Wales, and Victoria. Minute hairs around seeds are liable to cause skin irritation. 'Kurrajong'. Fig. 254.

B. populneum (Schott) R.Br.

DILLENIAEAE

HIBBERTIA Andr.

1. Leaves narrow, linear with recurved or revolute margins; ovary hairy.
2. Low shrub to 40 cm. high; stems erect or decumbent, mostly unbranched, pubescent when young; leaves 5-10 mm. long, 1 mm. wide, pubescent when young, later scabrid or glabrescent, hairs simple or paired from minute tubercles and upturned, margins revolute; flowers sessile, terminal to short axillary shoots, subtended by narrow brown villous bracts; sepals villous to subglabrous on back and upper part of inner face, oblong to broadly lanceolate, acute or apex conduplicate-apiculate, 5-7 mm. long, ciliate; petals broadly cuneate, deeply notched, 1-1½ times as long as sepals, margins undulate; stamens 8-14, all placed to one side of 2-celled villous ovary. A member of the *H. stricta* complex which includes forms with glabrous or with stellate hairs on the leaves. On stony slopes with shallow soils in dry sclerophyll habitats, mainly at lower elevations. Members of the *H. stricta* complex are widely distributed throughout southern and eastern Australia and in Tasmania. 'Lesser Guinea Flower'.

1. *H. calycina* (DC.) N.A.
Wakefield

2a. Prostrate or procumbent shrub; leaves similar to those of preceding species; flowers on slender peduncles longer than the leaves; calyx villous or only sparsely so, outer sepals lanceolate with narrow thick apex, inner broader and obtuse-apiculate, 7-9 mm. long; petals deeply notched; stamens 15-22, arranged around the silky villous 3-celled ovary, a few staminodia also present. Apparently rare in the A.C.T. but collected along the Sutton road on the northern boundary; also south-eastern New South Wales and eastern Victoria.

2. *H. pedunculata* R.Br. ex DC.

1a. Subshrub or small shrub rarely more than 30 cm. high, softly pubescent; *leaves narrowly oblanceolate to spatulate-oblanceolate*, very obtuse, 1-5 cm. long but smaller on axillary shoots; flowers terminal to short lateral shoots, subtended by cluster of leaves and brown bracts; sepals oblong, obtuse, 7-10 mm. long, glabrous or sparsely hairy on back, ciliate on margins, hairy within on upper parts; petals golden-yellow, broadly obovate-cuneate with shallow notch, to twice as long as sepals; *stamens numerous, arranged around 2-3-celled glabrous ovary*. Very common species of woodland and forest habitats, persistent on disturbed areas cleared for pasture; widespread in southern New South Wales and Victoria. Fig. 255.

3. *H. obtusifolia* DC.

GUTTIFERAE

HYPERICUM L.

1. Perennial herb with *rigid erect stems to 1 metre high* and stiff spreading lateral branches; leaves linear or oblong, 1-3 cm. long, marked by translucent glands, obtuse or acute; flowers in broad cymose corymbs terminating annual shoots; sepals lanceolate, 4-5 mm. long, acuminate, gland-dotted; petals golden-yellow with black glands near margins, *about 2-2½ times as long as sepals*; stamens numerous; styles 3; capsule twice as long as persistent calyx; seeds brown, pitted. A declared noxious weed but not common in the A.C.T.; native to Europe, the Mediterranean, and western Asia. 'St John's Wort'.

1. **H. perforatum* L. var. *angustifolium* DC.

1a. Petals as long as or slightly longer than calyx; small herbs less than 40 cm. high.

2. Glabrous perennial herb, *erect stems* often simple above the sub-rhizomatous base, almost angular, 10-30 cm. high; *leaves narrow lanceolate or oblong*, sessile, slightly stem-clasping, 10-15 mm. long, marked below with gland dots, *margins recurved*; *flowers terminal in dichotomous cymes*; sepals oblong with longitudinal nerves and scattered glands, 4-5 mm. long; petals as long as or slightly longer than sepals, obtuse; stamens not in bundles; capsule slightly longer than calyx. Common in woodland and forest habitats at lower elevations but also at higher altitudes; also southern and eastern Australia, Tasmania, New Zealand, and New Caledonia. 'Small St John's Wort'. Fig. 256.

2. *H. gramineum* G. Forst.

2a. *Weak decumbent* perennial herb, commonly forming mats among grasses and other herbs, rarely more than 10-15 cm. high and often smaller; *leaves ovate or shortly oblong, margins flat or undulate*, obtuse, 3-8 mm. long; *flowers solitary or in few-flowered cymes* terminal to simple stems; sepals linear, 3-4 mm. long; petals shorter than or equal to sepals, orange-yellow; stamens few; capsule about as long as persistent calyx. Common in swampy ground particularly in grassy flats of mountain gullies; also New South Wales, Victoria, South Australia, Tasmania, New Zealand, and eastern Asia. 'Matted St John's Wort'.

3. *H. japonicum* Thunb.

ELATINACEAE

ELATINE L.

Creeping herb in wet mud or temporarily submerged, often rooting at nodes, glabrous; leaves opposite with minute deciduous stipules; flowers sessile in axils, minute, usually 1 per leaf-pair; sepals 3, membranous; petals 3, pink, stamens 3; ovary superior, 3-celled; capsule subglobular, about 1 mm. diameter. In wet drains or swampy pools at all elevations but easily overlooked; widespread in temperate Australia and Tasmania, also in New Zealand. 'Water Wort'. Fig. 257.

E. gratioides A. Cunn.

VIOLACEAE

1. Herbs, fruit a 3-valved capsule.

1. *Viola*

1a. Low shrubs at high elevations, fruit a berry.

2. *Hymenanthera*

1. *VIOLA* L.

1. Perennial; stipules not conspicuous and not lobed, leaves with slender petioles.

2. Leaves in a radical tuft from a rhizome or tufted at the nodes of the stolon, blades obtuse or almost truncate at junction with petiole.

3. *Leaves in radical tufts*, glabrous, petioles 2-14 cm. long, *stipules adnate with spreading free points; blades triangular-ovate to lanceolate*, obtuse, 1.5-8 cm. long, 0.6-2 cm. wide; flowers on slender peduncles longer than leaves; sepals linear-lanceolate, acuminate, 5-7 mm. long, with short basal appendages; petals 2-3 times as long as sepals, varying in intensity of colour but *usually violet with paler claw*, lateral petals bearded within, lower petal shortly spurred at base; capsule trigonous, 3-celled, acuminate; seed pale, subglobular. Common especially in forest habitats of upper slopes and in alpine woodland but not restricted to these; also New Guinea, eastern Australia from Queensland to Tasmania, rare in South Australia. Flowers sweet-scented. 'Mountain Violet'. Fig. 258.

1. *V. betonicifolia* J. E. Sm.

3a. *Creeping glabrous herb with small clusters of long-petioled leaves at nodes* of shallow rhizome or stolon; stipules slender, free from petiole; *leaf blades reniform to transversely elliptical*, 7-12 mm. long, often broader than long; peduncles longer than or as long as leaves; sepals linear or linear-lanceolate, 4-5 mm. long, basal appendages short; *petals white with violet or purple patch in lower half*, twice as long as sepals, lateral ones bearded within, lower one pouched rather than spurred at base; capsule trigonous, seeds ovoid, obtuse at ends. Common in damp shaded places (under shrubs or in lee of banks in forest) throughout the mountains and at lower elevations; distribution similar to that of preceding but less rare in South Australia; also Malaya. 'Ivy-leaf Violet'.

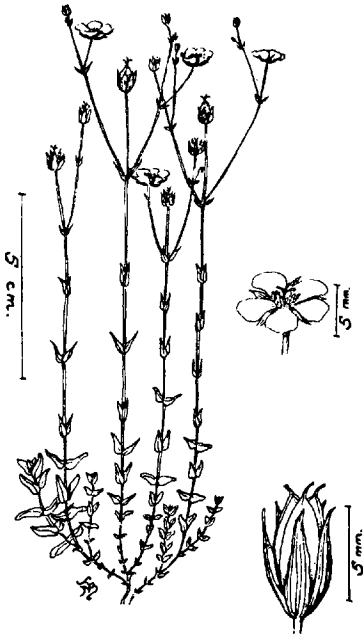
2. *V. hederacea* Labill.

2a. Straggling herb with trailing stems or stolons, *leaves not tufted at nodes*, stipules free; leaf blades broader than long, *deeply cordate at base with broad sinus*, obtuse, peduncles longer than leaves; sepals lanceolate, 3-4 mm. long, basal appendages short; *petals white, veins sometimes purple especially on lower petal*, 2-3 times as long as sepals; lower petal with short broad spur; capsule trigonous, seeds ovoid. Not a common species though found from New South Wales to Tasmania; in the A.C.T. is only known from upper waters of Orroral River at about 3000 ft.

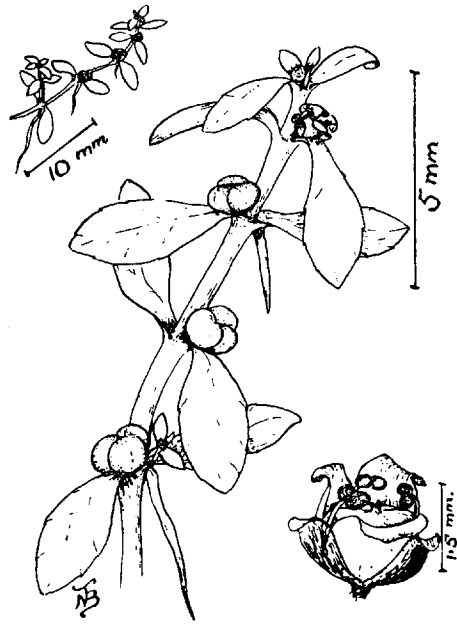
3. *V. caleyana* G. Don

1a. *Annual pubescent herb* with decumbent-ascendent *angular stems*; leaves broadly ovate to elliptical, crenate, obtuse; stipules from half as long as to longer than their leaves, *pinnately divided into linear lobes*, the terminal lobes larger and leaflike; flowers axillary, peduncles as long as subtending leaf in flower, twice as long in fruit; sepals lanceolate, acuminate, with basal appendages, lower sepals 7-8 mm. long and slightly longer than upper; petals creamy or with darker bases, shorter than or as long as sepals; lower petal with a short spur; capsule trigonous, slightly longer than calyx. Of European origin but now naturalised in some places in temperate Australia and Tasmania; uncommon in the A.C.T. 'Field Pansy'.

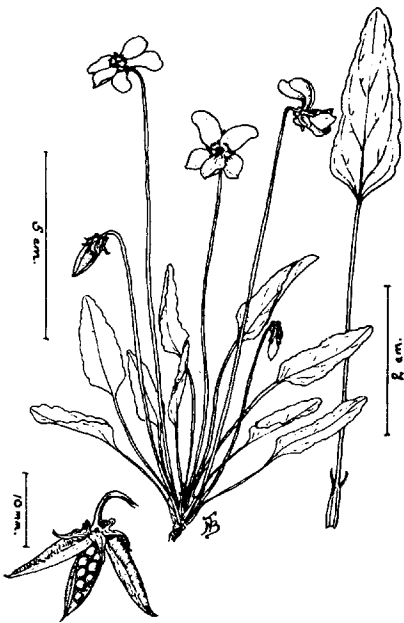
4. **V. arvensis* Murray



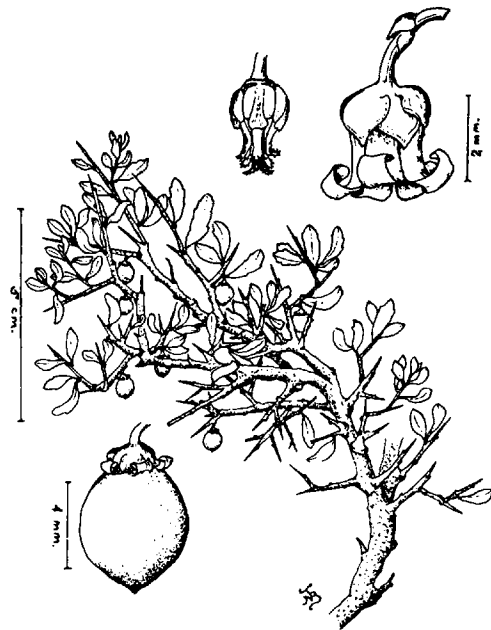
256. *Hypericum gramineum*



257. *Elatine gratioides*



258. *Viola betonicifolia*



259. *Hymenanchera dentata*

2. HYMENANTHERA R.Br.

Rigid shrub with glabrous leaves and intricately branched stems, commonly less than 60 cm. high, ultimate branchlets ending in spines; leaves linear or oblong, obtuse to acute, 1.3-5 cm. long, thick, sessile or shortly petiolate, entire or larger ones with few teeth; flowers solitary or paired in axils, sometimes unisexual, bracteoles minute; sepals orbicular, 2-3 mm. long; petals yellowish, twice as long as sepals, the apices recurved; males with anthers bearing terminal fringed appendage, females smaller with imperfect anthers, stigma 3-lobed; berry purplish but drying to white, subglobular, 4-5 mm. diameter. At high elevations in subalpine habitats, usually near or on granite outcrops, or in cold mountain valleys. Often made conspicuous by the presence of a bright orange lichen on the stems. Also New South Wales, Victoria, South Australia, and Tasmania. Fig. 259.

H. dentata R.Br. ex DC.

THYMELAEACEAE

PIMELEA Banks et Sol.

1. Flowers in dense terminal heads subtended by an involucre of 4 or more bracts similar to leaves but commonly broader and sometimes reddish; leaves opposite, stems and leaves glabrous.

2. Bracts 4; leaves narrow elliptical, linear-oblong to oblanceolate, less than 5 mm. wide; endocarp (after removal of base of calyx and epicarp) narrow ovoid-oblong with blunt hooked apex, with fine pattern of longitudinal wrinkles and minute pits.

3. Shrub less than 1 metre high or low and spreading; leaves 7-12 mm. long, 2-4 mm. wide, concave above, with minute recurved apiculum; involucre bracts broader than leaves but otherwise similar, outer glabrous on both sides though sometimes ciliate on upper margin, *inner densely villous-ciliate on margins*, sometimes hairy within towards apex; hairs of receptacle more than $\frac{1}{2}$ as long as base of calyx tube (to as long in flower); *calyx tube glabrous below, woolly villous above*, 10-12 mm. long, lobes 2-3 mm. long; stamens and style almost as long as lobes; tube circumsciss at top of glabrous base. In dry sclerophyll habitats, at low to medium altitudes; also New South Wales, Victoria, South Australia, and Tasmania.

1. *P. glauca* R.Br.

3a. With general similarity to preceding and usually a slender diffuse shrub to 80 cm. high (probably short-lived); leaves 8-15 mm. long, 2-3 mm. wide, flat or concave, thickened at apex but not apiculate; *bracts glabrous*, ovate to broadly ovate, about as long as leaves, commonly tinged with red or purple; hairs of receptacle short; *calyx base with strigose hairs*, loosely appressed villous above, tube 10-13 mm. long, lobes 3-4 mm. long; stamens almost as long as lobes, style as long or short and barely exerted; tube circumsciss at junction of hair types, base later more or less scarious. Very common species in woodland and dry forest habitats at lower altitudes; from south-eastern Queensland to Tasmania. At present the name is applied to a wide range of material. When so used it covers two high elevation forms in the A.C.T., both of which are low undershrubs with a subcorymbose growth habit. In one the bracts are similar to the leaves and up to $\frac{1}{2}$ as long as the flowers; the calyx tube is villous with loose spreading hairs and the insides of the lobes dry to a creamy or biscuit colour. In the other the bracts are narrow elliptical-lanceolate, pale at the base and up the midribs and almost as long as the flowers; the calyx tube is villous with soft appressed hairs and the insides of the lobes dry to yellow. 'Rice Flower'. Fig. 260.

2. *P. linifolia* J. E. Sm. sens. lat.

2a. Bracts more than 4, fruit ovoid with narrow apex, endocarp smooth and glossy.

4. Shrub to 1 metre high; *leaves broadly oval or oblong to broadly elliptical, 1.5-5 cm. long, 0.7-1.8 cm. wide*, paler beneath, apices rounded-obtuse to acute; *bracts 6-8, broadly ovate*

to almost orbicular, reddish, 10-15 mm. long, at least the inner ones long-ciliate with more or less appressed pubescence on inner face; receptacle with very short hairs; flowers very numerous; *base of calyx tube pubescent and also with strigose hairs*, upper part loosely appressed villous, tube 9-11 mm. long, lobes 4-5 mm. long; filaments of stamens as long as lobes; style to twice as long; tube circumsciss; fruiting heads almost globose within bracts. A common shrub of alpine woodland and scrubby areas; at high elevations in Australian Alps, and in Victorian Alps. An undescribed variety.

3. *P. ligustrina* Labill. var.

4a. Erect diffuse shrub to 60 cm. high; *leaves elliptical*, 1.5-3.5 cm. long, 4-6 mm. wide, acute or acuminate; heads pedunculate above upper leaves; *bracts 8-10, with ovate base and acuminate upper portion*, 8-12 mm. long, pale below and up the centre, margins ciliate, *inner surface densely sericeous*; receptacle densely villous; flowers numerous per head; *base of calyx tube glabrous below but densely strigose-villous above with erect hairs*, upper part of calyx villous with soft hairs, tube 9-12 mm. long, lobes 3-3.5 mm. long, stamens little shorter than lobes, style as long or slightly longer; base of tube obconical-truncate in fruit with persistent erect hairs above. Common in the A.C.T. in sclerophyll forests above 2500 ft; south-eastern New South Wales and north-eastern Victoria.

4. *P. treyvaudii* F. Muell. ex Ewart et Rees

1a. Flowers clustered or few together and apparently axillary, without distinct involucre bracts; flowers unisexual or bisexual, sometimes mixed in one inflorescence.

5. *Slender shrub to 2 metres high, stems, leaves and calyces glabrous*; leaves opposite, narrow elliptical, 1-2 cm. long, 2-3 mm. wide, flat or margins slightly incurved; leaves subtending flowers slightly broader; heads few-flowered, mostly terminal to short lateral shoots; flowers on short pedicels of uneven length; calyx 2-3 mm. long, lobes at least $\frac{1}{2}$ as long as tube; male flowers with anthers whose broad cells are placed back to back; *in fruit calyx tube becomes thinly scarious*, crowned by persistent lobes but loose around ovary whose fleshy epicarp is adherent to endocarp. Not common in the A.C.T. but distributed from south-eastern New South Wales (at higher elevations) to Tasmania. Often grows in thickets. 'Poison Pimelea'.

5. *P. pauciflora* R.Br.

5a. Small shrubs or undershrubs with hairy stems, leaves and calyces; anthers with cells side by side on a broad connective.

6. Leaves alternate or mostly so; heads many-flowered, flowers yellow or brownish-yellow within.

7. Low undershrub or subshrub with seasonal stems from rhizome; *vestiture appressed-sericeous; leaves scattered on elongated stems*, elliptical to narrow oblanceolate, 6-10 mm. long, appressed-strigose especially on undersurfaces; flowers in short headlike spikes terminal to main stem or very short axillary shoots, usually with 1 or 2 pairs of leaves; calyx sericeous throughout except for glabrous margins of lobes, *tube commonly curved* and 4-7 mm. long; style sometimes very short and not exerted; calyx circumsciss above base which becomes subscarious in fruit; *fruit narrowly ovoid-elliptical* scarcely hooked at summit, epicarp glossy with minute pattern of reticulate punctae. Very common species in dry sclerophyll habitats at low and medium altitudes; from Queensland to Tasmania and South Australia.

6. *P. curviflora* R.Br.

7a. Ascendent undershrub or slender shrub to 1 metre high; *vestiture of loose and spreading hairs*; leaves oblong to ovate-elliptical, 0.8-2 cm. long, 3-8 mm. wide, flat or margin slightly recurved; flowers in headlike clusters terminal to leafy stems or short lateral shoots or

apparently axillary, subtended by several leaves; calyx densely strigose-villous on base, sparsely so on tube above and with longer hairs at base and up back of lobes, tube to 7 mm. long in male flowers, slightly shorter in females; *base of tube becoming glossy-scarious* and loose; *endocarp broadly ovoid with narrow apex*, glossy black, minutely punctulate. In dry sclerophyll forests but much less common than the preceding species.

7. *P. aff. hirsuta* Meisn.

6a. Prostrate subshrub forming low mats; vestiture of loosely appressed strigose hairs; *leaves opposite*, ovate to elliptical, 5-9 mm. long, *upper surface glabrous* or almost so; *flowers paired*, terminal, subtended by 2 pairs of leaves from the axils of which shoots later develop; *calyx tube 4-5 mm. long, red or reddish-brown within*; endocarp broadly ovoid with narrow hooked apex, surface texture as in preceding species. Borders of swamps at high elevations, e.g., Snowy Flats (Mt Gingera); also Australian Alps and north-eastern Victoria.

8. *P. biflora* N. A. Wakefield

LYTHRACEAE

LYTHRUM L.

1. *Decumbent glabrous annual* (sometimes biennial); leaves mostly alternate or few sub-opposite, sessile, oblong, oblong-lanceolate, or linear, 6-16 mm. long, 1.5-6 mm. wide, obtuse; *flowers axillary*, subsessile with pair of minute bracteoles, tubular torus 2.5-3 mm. long, sepals 4-6 and less than 1 mm. long, petals pink, 1-1.5 mm. long; torus enlarged in fruit to 5 mm. long and 1.5 mm. in diameter, adpressed to stem. Common in damp places especially in disturbed areas. Cosmopolitan, widespread occurrence in Australia, may or may not be native. 'Hyssop Loosestrife'.

1. *L. hyssopifolia* L.

1a. *Perennial, softly scabrid herb with erect leafy flowering stems* from rhizome, stems slightly angular; leaves opposite or almost so, 2-7 cm. long, sessile, lanceolate, acuminate; *flowers clustered in axils of leafy bracts and in a long terminal spike*, pedicels short; torus 5 mm. long, hairy on conspicuous ribs; sepals 5-6, hairy; petals linear obtuse, deep pink or light purple. (Flowers of 3 types—with short style enclosed and two stamen series exerted, with style of medium length and one stamen series enclosed, or with style longer than both stamen series one of which is enclosed); torus not much lengthened in fruit. In wet and swampy places in or near creeks and swamps e.g., gullies along Brindabella road and near Point Hut, Murrumbidgee River. Almost cosmopolitan, widespread in south-eastern and eastern Australia and in Tasmania. 'Purple Loosestrife'. Fig. 261.

2. *L. salicaria* L.

MYRTACEAE

1. Fruit indehiscent; shrubs with leaves less than 5 mm. long.

2. Calyx lobes with long hairlike points, leaves alternate.

1. *Calytrix*

2a. Calyx lobes short, obtuse, persistent like the petals; leaves opposite; reddish angular fruit persistent for some months.

2. *Micromyrtus*

1a. Fruit dehiscent and several celled.

3. Shrubs with small leaves, flowers not in umbels.

4. Stamens in a single row, not exceeding the petals (rarely equal or slightly longer).

5. Leaves opposite; ovary 2-3-celled.

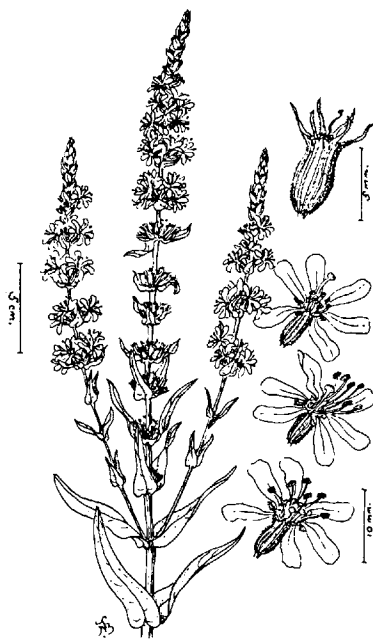
3. *Baeckea*

5a. Leaves alternate; ovary usually 5-celled (3-celled in one species).

4. *Leptospermum*



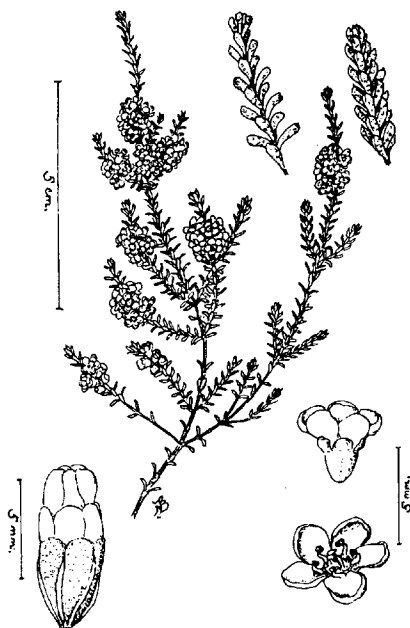
260. *Pimelea linifolia*



261. *Lythrum salicaria*



262. *Calytrix tetragona*



263. *Micromyrtus ciliata*

- 4a. Stamens in more than one row, numerous, longer than petals.
6. Stamens slightly longer than petals; flowers sessile in terminal heads.

5. **Kunzea**

- 6a. Stamens much longer than petals; flowers in spikes of which axis later elongates in a leafy shoot.

6. **Callistemon**

- 3a. Trees or large shrubs with broad leaves, flowers in umbels.

7. **Eucalyptus**

1. **CALYTRIX** Labill.

Erect shrub to 60 cm. high, glabrous or minutely hairy when young; leaves triangular in cross section, thicker towards obtuse or apiculate apex, flat on upper surface, margins glabrous or ciliate, 3-5 mm. long, dotted with oil glands; flowers solitary in upper axils, sometimes clustered in leafy heads; bracts scarious with dark midrib, obtuse or acute, about $\frac{1}{2}$ as long as bracteoles which are scarious with dark midrib, 4 mm. long, free, with truncate apiculate apices or emarginate; calyx tube long and very slender, lobes broadly obovate or cuneate to about 3 mm. long with slender hairlike points to 15 mm. long; purplish drying brown; petals white or pinkish, deciduous; calyx persistent around fruit. Not common in the A.C.T. but widespread throughout southern and eastern Australia and Tasmania. Occurs locally in heathy scrub along river valleys. Fig. 262.

C. tetragona Labill.

2. **MICROMYRTUS** Benth.

Low glabrous shrub to 70 cm. high; leaves opposite, the pairs alternating to form 4 rows along the branches, 2-3 mm. long, triquetrous, margins minutely ciliate, oil glands present, petiole minute; flowers solitary, sessile in leaf axils, forming leafy spikes or heads on shorter laterals; bracteoles ovate, keeled, minutely ciliate, about 1.5 mm. long; calyx tube 3 mm. long, 5-ribbed, ribs passing into the orbicular ciliolate lobes less than 1 mm. long; petals twice as long as lobes, the centres thicker and with oil glands; stamens 5, opposite petals but shorter than them; flowers persistent, slightly enlarged and reddish in fruit. In dry sclerophyll habitats at medium altitudes; Naas, Tharwa-Mt Tennent, Booroomba; also New South Wales, Victoria, and South Australia. 'Heath Myrtle'. Fig. 263.

M. ciliata (J. E. Sm.) Druce

3. **BAECKEA** L.

1. *Leaves 2-4 mm. long, triquetrous, upper face concave or channelled, convex below but not keeled; flowers axillary on lateral shoots; bracteoles linear, soon deciduous; pedicels shorter than calyx tube which broadens above middle; lobes obtuse, centrally thickened, obscurely keeled; petals 1½-2 times as long as lobes, 1.5 mm. long; stamens 5-7.* Shrub of sphagnum swamps at high elevations, to 1.5 metres high; also New South Wales, Victoria, and Tasmania.

1. **B. gunniana** Schau.

1a. *Leaves 4-6 mm. long (except variety), elliptical to linear-spathulate, almost flat above, keeled on medium line below, flowers axillary on pedicels as long as or longer than tube which is turbinate and broadened at margin only; lobes not keeled or centrally thickened; petals more than twice as long as lobes, 2-2.5 mm. long; stamens 7-10 (commonly 8); capsule cupular on slender pedicel.* Shrub 1-3 metres high, along creeks in forest gullies or near swamps at high elevations; also in New South Wales and Victoria. Fig. 264.

2. **B. utilis** F. Muell. ex Miq.

Note: Plants with leaves to 10 mm. long and larger flowers with petals 4-5 mm. long represent var. **latifolia** (Benth.) J. H. Willis, which is uncommon in the A.C.T. though collected on Mt Gingera; also found in New South Wales and Victoria.

4. **LEPTOSPERMUM** J. R. et G. Forst. See Wakefield (1955)

1. Thalamus tube and sepals glabrous or almost so with the sepals thin and subpetaloid, falling with or soon after petals; capsule woody, persistent several years.

2. Shrub to 3 metres high; *leaves pungent-pointed*, acute to acuminate, lanceolate to elliptical, 7-18 mm. long, concave above, the margins sometimes touching, lower surface loosely appressed-villous when young, later minutely scabridulous or glabrescent, midnerve more or less prominent (when dry) but lateral nerves sometimes obscure, margins scabrid; upper surface glabrous or pubescent when young; flowers subsessile on short axillary shoots which may bear few leaves; thalamus tube hemispherical to campanulate; sepals deltoid, 3-nerved, 2-2.5 mm. long, glandular, margins irregular; petals obovate, 4.5-6 mm. long, glandular; capsule 7-8 mm. diameter, 4.4-5 mm. high with valves forming half and protruding above calycine rim. On slopes of gullies at lower elevations, commonly adjacent to seepage areas; Queensland to Victoria, South Australia. 'Prickly Tea-tree'.

1. **L. juniperinum** J. E. Sm.

2a. Leaves not pungent-pointed, obtuse, acute or emarginate.

3. *Low shrub to 1 metre high*, with spreading habit; *leaves broadly obovate to oval*, 10-15 mm. long, of firm texture with conspicuous oil glands, *thinly appressed hairy on both surfaces when young*, *marginal hairs often persisting longest*, finally glabrescent; flowers sessile, appearing terminal to very short lateral shoots which may bear single leaf; *thalamus tube hemispherical*, 5-6 mm. long; *sepals stiff*, 3 mm. long, broadly ovate-orbicular, glandular, midrib evident, commonly pink-red with pale *ciliate margins*, a longer hair tuft on rounded apex; petals firm in texture, 5-6 mm. long, broadly obovate, glands obscure, venation obscure; capsule 7-9 mm. diameter, smooth valves broader than shrunken tube from which outer layer exfoliates. Among granite boulders or dominant in heath communities on exposed mountain summits; montane areas, south-eastern New South Wales and in Victorian Alps. 'Alpine Tea-tree'.

2. **L. micromyrtus** Miq.

3a. *Shrub to 2 metres high*, of erect habit; leaves narrowly oblanceolate to narrow obovate, 8-15 mm. long, thin, obtuse *appearing emarginate* due to reflexed minute apiculum which may be covered by hairs on young leaves; *both surfaces loosely appressed-hairy*, hairs crumpled, later glabrescent; flowers sessile on short laterals with few or no leaves; *thalamus tube campanulate in flower*, 2.5-3.5 mm. long, *glabrous or minutely* and sparsely pubescent; *sepals 1.5-2 mm. long*, ovate-orbicular, white or pinkish, glandular, glabrous or with few hairs in centre, *margin glabrous or sparsely irregularly ciliate*; *petals 3-4 mm. long*, veined, glands scattered; *capsule 4.5-5.5 mm. diameter*, outer layer of tube and valves exfoliating but calycine rim more or less persistent, valves slightly higher but not broader than the shallow tube. Common in damp habitats along creeks and river banks; also New South Wales and Victoria. 'Creek Tea-tree'.

3. **L. obovatum** Sweet

1a. Thalamus tube and sepals sericeous or villous or, if glabrous or subglabrous, the fruit not hard and woody or not persistent for more than a few months; sepals firm or dry in texture, usually persistent for some time on the young fruit.

4. Shrub to 3 metres high or more; leaves varying from narrow linear-elliptical or narrow oblanceolate to elliptical or oblanceolate, 8-25 mm. long, 1.5-4 mm. wide, acuminate to shortly acute, apiculate, vestiture variable; flower arrangement variable but *flowers on slender pedicels as long as or longer than the turbinate or campanulate thalamus tube*; sepals with green or reddish centres and thin often ciliate margins which are later incurved, about 1 mm. long ($\frac{1}{3}$ length of tube), prominent on truncate young buds; petals 2-3 mm. long, spatulate-obovate, narrow base slightly recessed between sepals; *stamens as long as*

or slightly longer than petals, filaments often thick with wrinkled surface; capsule sunken, 3-4-5-locular even on single plant, sepals persistent. Eastern New South Wales and Victoria. A distinctive but polymorphic species, the following three forms may be regarded as points in the range of variability to be seen locally. (a) Young leaves pubescent on upper surface, flowers axillary to deciduous bracts near bases of leafy lateral shoots—close to type form, *Baeckea phyllicoides* A. Cunn. ex Schau. (b) Young leaves loosely appressed-villous on both surfaces, flowers axillary to leaves along lateral shoots. Both (a) and (b) are common near creeks and rivers at low altitudes, e.g. Molonglo, Cotter, Murrumbidgee, and Paddy's rivers; the first being the more abundant. (c) Young leaves obscurely 3-nerved with hairs of upper surface restricted to nerve channels, young shoots protected by bracts during dormant season, racemes short and marked by scars from deciduous bracts, axis continued in short leafy shoot only under favourable conditions. This is found at high altitudes and in cold mountain valleys. It is close to *Kunzea peduncularis* F. Muell. ex Benth. 'Burgan'.

4. *L. phyllicoides* (A. Cunn. ex Schau.) Cheel

4a. Flowers sessile, subsessile, or on short pedicels not longer than tube; capsule not sunken; staminal filaments all shorter than petals.

5. Top of ovary hairy; leaves silky-villous (especially below) when young; thalamus tube and sepals not exfoliating from mature fruits which do not persist long on the branches.

6. Shrub varying from prostrate to ascendent to 2 metres high, branches diffuse, loosely appressed-sericeous, glabrescent to wholly glabrous later; leaves 3-10 mm. long, elliptical-oblong to oblanceolate, acute or obtuse, apiculate, obscurely 3-nerved but only midrib prominent; flowers subsessile, apparently terminal to very short lateral shoots which bear 2-3 leaves, peduncles marked by bract and bracteole scars; thalamus tube appressed-silky (rarely glabrous); sepals sparsely hairy or subglabrous in centre of outer face, margins ciliate, inner face sparsely hairy; capsule 3-4 mm. diameter, valves about as high as cupular base, 3-locular, sepals persistent and erect. A common shrub on hills around Canberra; New South Wales, Victoria.

5. *L. multicaule* A. Cunn.

Note: Has been confused with *L. trivalve* Cheel which differs in less persistent vestiture, loose silky hairs on tube and more sunken capsule.

6a. Shrub to 3 metres high, young foliage softly appressed-villous but soon glabrescent; leaves 7-15 mm. long, elliptical to oblanceolate or obovate, obtuse or acute, apiculate, 3-nerved; flowers apparently axillary but actually 1 or 2 lateral to bracteate base of very short lateral shoot which may develop a few leaves above the flowers; bracts and bracteoles soon deciduous; pedicels shorter than or as long as thalamus tube, both densely villous with loose or spreading hairs; sepals narrow triangular but obtuse, more or less villous outside, tomentose with short hairs on inner face but with long hairs towards apex; capsule 5-locular (rarely 6), 4-5 mm. diameter, valves and tube not woody, valves shorter than broader cupular base, capsules usually falling before next flowering period. Lower slopes of gullies at lower elevations, commonly growing in association with *L. phyllicoides*, e.g., at Cotter Reserve. Also south-eastern New South Wales and Victoria.

6. *L. brevipes* F. Muell.

5a. Top of ovary glabrous; leaves villous with loose or appressed hairs at least when young; fruit woody and persisting for several years; capsule 5-locular, more than 4 mm. diameter; outer epidermal layer of thalamus tube and of valves exfoliating from mature fruit.

7. Shrub 1-2 metres high (less commonly to 3 metres), sericeous or appressed-villous on young foliage, glabrescent by the second year; leaves oblanceolate or obovate, 5-10 mm. long, obtuse, concave below or flat but margin incurved to subapiculate apex which when

young has an apical hair tuft; *flowers very shortly pedicellate*, apparently terminal to short leafy branchlets; about 10 mm. diameter; *bracts and bracteoles soon deciduous*, villous on outer face; pedicels and thalamus tube silky-villous with loosely erect hairs; sepals about 2 mm. long, $\frac{1}{2}$ as long as tube, thin, sub-orbicular, villous without, sparsely hairy within, not persistent on fruit; capsule 5-6 mm. diameter, valves finally about $1\frac{1}{2}$ times as high as saucer-shaped or cupular base. Shrub of forested gullies and high mountain valleys and ridges, commonly near seepage or swamps; eastern New South Wales and eastern Victoria. 'Swamp Tea-tree'. Fig. 265.

7. *L. myrtifolium* Sieb. ex DC.

7a. Shrub 2-3 metres or small tree to 5-6 metres high; young foliage villous-pubescent or pubescent; leaves varying from oblong or elliptical to oblanceolate or narrowly obovate, *apices narrowed to mucro*; *flowers sessile, the broad chartaceous villous bracts and bracteoles commonly persistent to flowering stage*; *thalamus tube densely villous with spreading hairs*; sepals broadly ovate, obtuse, 2.5-3.5 mm. long, densely villous outside, inner face tomentose or tomentose-villous in upper half; flowers about 1.5 cm. diameter with petals about twice as long as sepals and broadly obovate above claw-like base; sepals persisting on young fruit until exfoliation of tube. A common species of mountain gullies, along creeks and in wet sclerophyll forest, especially above 2500 ft. At lower levels of the altitudinal range the leaves may be only 6-10 mm. long and concave below though with the upper part of the margin upturned to form a channel towards the recurved mucronate apex. In this form the vestiture of young leaves has a lower stratum of contorted hairs while the spreading apices of some form an upper stratum; the fruits are about 6-7 mm. diameter. It can be found in the Tidbinbilla Valley. A second form, to be found in the cold valleys and gullies of the Naas-Gudgenby area, may grow to a small tree with leaves 9-20 mm. long and flat without a channelled apex and the vestiture when young lacks a definite lower stratum though some hairs have twisted bases, the fruit is about 6-7 mm. diameter. A third form is that most common in wet forested gullies and at high elevations. It has leaves 12-25 mm. long which are flat or concave below, the vestiture when young being villous with numerous hairs lacking twisted bases and the fruit, which is densely villous at first, remains thinly so even after exfoliation. The species is widespread in New South Wales, Victoria, and Tasmania. 'Woolly Tea-tree'.

8. *L. lanigerum* (Ait.) J. E. Sm.
sens. lat.

5. *KUNZEA* Reichenb.

1. Shrub 2 metres high, young branchlets villous or pubescent, later glabrescent; leaves alternate or loosely imbricate and sub-opposite on smaller branchlets, 2-3.5 mm. long, *obovate-oblanceolate, recurved, rounded-obtuse with minute apiculum on undersurface of apex*, glands conspicuous, midnerve evident on undersurface, pubescent when young, later glabrescent, flowers in heads terminal to smaller branchlets, axis rarely growing out after flowering; ovate bracts and bracteoles hairy or ciliate, keeled, $\frac{1}{2}$ as long as thalamus tube (2 mm.) which is glabrous and twice as long as sunken ovary; sepals triangular to ovate, 0.75 mm. long, glabrous, margins incurved to acute apex; *petals pinkish-mauve*, about 1.5 mm. long; stamens with *pink-mauve filaments*, attached to ring which is later prominent on young fruit; tube not enlarged in fruit though becoming urceolate, persistent sepals erect. Shrub of low slopes in open valleys, often near seepage areas, below 2500 ft; south-eastern New South Wales and Victoria. Fig. 266.

1. *K. parvifolia* Schau.

1a. Small shrub commonly prostrate to 1 metre diameter but sometimes ascendent to 30 cm. high, young foliage pubescent to villous; young shoots protected by short broad deciduous bracts; leaves crowded at ends of branchlets, 3-7 mm. long, *margins incurved giving terete*

appearance, hairs in channel more persistent than on exposed surfaces; flowers few per head, commonly crowded on short axillary shoots towards ends of branches; bracts and bracteoles ovate, villous, keeled (or bracts striate), about as long as thalamus tube; tube 2 mm. long, loosely villous; sepals 1 mm. long, triangular-ovate, keeled to acute apex; sparsely villous outside with few short hairs on inner face; *petals yellow*, 1.5 mm. long, orbicular-obovate, concave; stamens yellow, ring not conspicuous on young fruit; tube villous in fruit but not turgid-urceolate. A subalpine species of high elevations in Australian and Victorian Alps, collected by Cambage in 1912 at Upper Cotter at 4400 ft.

2. **K. muelleri** Benth.

6. **CALLISTEMON** R.Br.

1. Leaves narrow linear to narrow elliptical, less than 3 mm. wide, acuminate, oil glands lacking from upper or both surfaces.

2. Shrub to 2 metres high; at first villous but soon glabrescent; *leaves 1.5-2.5 cm. long*, 2 mm. wide, *apex with callous tip, scattered oil glands on undersurface*; flowers in dense spikes 2-4 cm. long, to 2 cm. diameter, terminal at first but axis growing out in leafy shoot after flowering; rhachis villous; bracts acuminate and longer than flowers, mostly soon deciduous but uppermost flowers in axils of *bracts striate at base but leaflike above*; *thalamus tube villous*, 2.5-3 mm. long; sepals oblong-orbicular, 1 mm. long, rounded-obtuse, sparsely villous, margins ciliate, often reddish; petals creamy to pale yellow, to 3 mm. long, obovate-oblong, concave, margins ciliate; stamens numerous, filaments about 3 times as long as petals; capsule glabrous, subglobular with very small orifice, to 8 mm. diameter, 3-locular. Common in and near sphagnum swamps and water courses at high elevations; montane habitats in eastern New South Wales and north-eastern Victoria. 'Alpine Bottlebrush'.

1. **C. sieberi** DC.

2a. Shrub to 3 metres or small tree; foliage villous when young, later glabrescent; *leaves 2.5-5 cm. long*, 1.5-2.5 mm. wide, acuminate *apex with mucro about 1-1.5 mm. long*, both surfaces without oil glands; spikes 3-5 cm. long, 2.5-3 cm. diameter, axis continued as leafy shoot soon after flowering; rhachis pubescent; bracts shorter than buds, broadly ovate obtuse or uppermost flowers in axils of leaves with petiole-like base; *thalamus tube glabrous*, 2 mm. long; sepals about 1.5 mm. long, glabrous but margins ciliate; petals creamy to pale yellow, 3-4 mm. long, orbicular, concave, ciliate; staminal filaments to 3 times as long as petals, sometimes pinkish; capsule glabrous, subglobular, 5-6 mm. diameter, 3-locular. Common along banks of creeks and rivers at lower elevations, especially in stony habitats, e.g. in Molonglo Gorge; New South Wales, Victoria, South Australia and Tasmania. 'Swamp Bottlebrush'. Fig. 267.

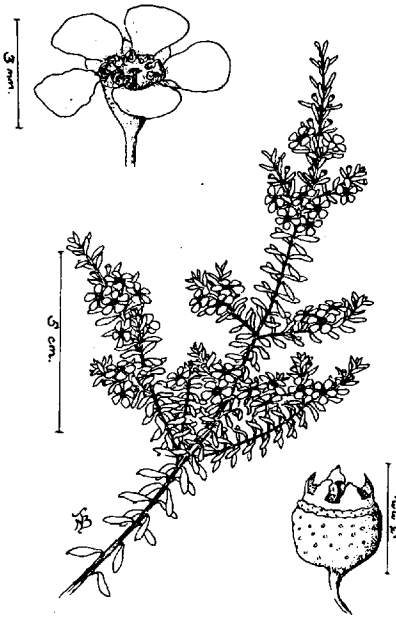
2. **C. paludosus** F. Muell.

1a. Shrub to 1 metre high (locally); young foliage villous soon glabrescent; *leaves broadly elliptical, 2.5-5 cm. long, 6-8 mm. wide*, midrib and submarginal veins evident with reticulate veinlets between, *both surfaces with conspicuous oil glands, acute or obtuse apex with callous tip*; spikes 3.5-4 cm. diameter, axis continued soon after flowering; rhachis villous; bracts ovate, striate, longer than buds, soon deciduous except uppermost which are more like leaves; *thalamus tube villous*, 3-4 mm. long; sepals triangular-orbicular, 1.5-2 mm. long, villous, margins long-ciliate; petals creamy to pale yellow, 4-5 mm. long, oblong, concave, sparsely hairy with ciliate margins. A dominant species in heath on exposed mountain slopes at high altitudes, e.g. Mt Coree; New South Wales, Victoria, and Tasmania. 'Lemon Bottlebrush'.

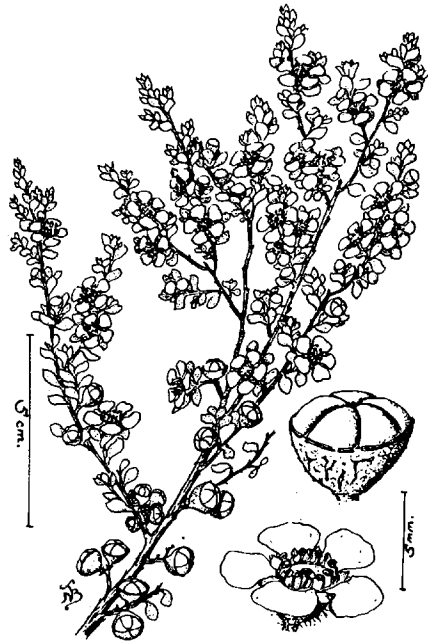
3. **C. pallidus** (Bonpl.) DC.

7. **EUCALYPTUS** L'Hér.

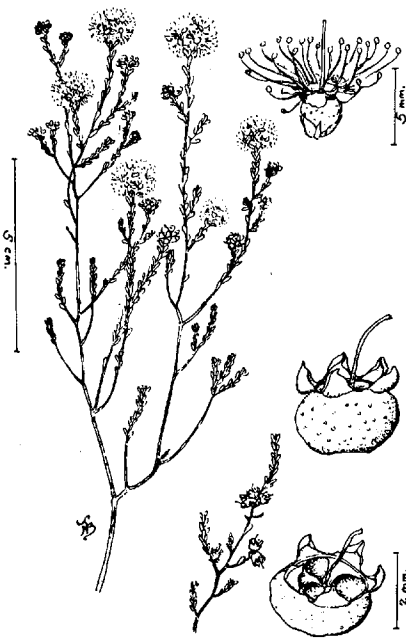
Note: For a list of hybrids which occur naturally in the A.C.T., see Pryor, L. D. (1954), *Canberra, a Nation's Capital*, H. L. White (ed.), p. 164.



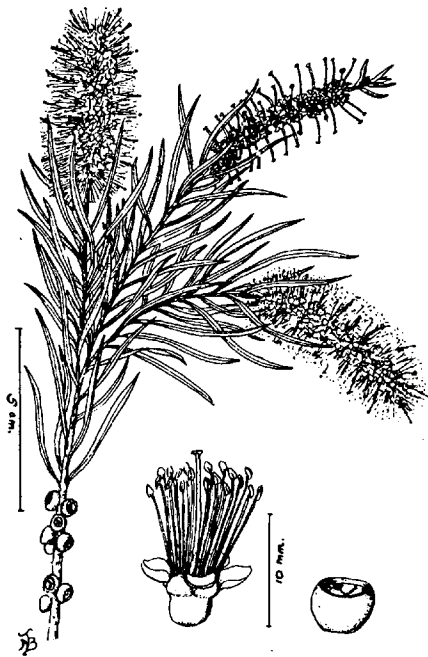
264. *Baeckea utilis*



265. *Leptospermum myrtifolium*



266. *Kunzea parvifolia*



267. *Callistemon paludosus*

1. Buds and fruits always 3 per umbel, anthers opening by slits with empty cells placed more or less back to back or side by side.
2. Mature leaves at least 4 times as long as broad and alternate.
3. Tall trees with *creamy bark which exfoliates in long strips*; typically with columnar trunk but with low branches when growing in open sites, sometimes with short trunk and some rough bark at base in lower altitude habitats; *juvenile leaves linear-lanceolate (seedling) or narrow lanceolate, not glaucous, sessile*; mature leaves shining, firm in texture, often falcate, lanceolate to broad lanceolate, long acuminate, 10-20 × 2-4 cm.; umbels axillary or along leafless portions of shoots; buds not glaucous, 6-7 × 4 mm., shortly pedicellate, top hemispherical-conical and obtuse or obtuse-apiculate; mature fruit to 8-9 × 6-7 mm. with broad rim which together with the broadly triangular projecting valves is almost as high as cupular base, 3-4-locular. (In immature but dehisced fruit the rim is narrower.) In mountain gullies especially near water such as permanent creeks or lower parts of valleys; also from New South Wales to Tasmania and South Australia. 'Ribbon Gum', 'Manna Gum'.

1. *E. viminalis* Labill.

- 3a. Juvenile foliage broad, ovate cordate or perfoliate; bark not falling in long strips, commonly turning red or pinkish on western aspect before exfoliation (tall trees) or bark flaked and not reddening (diffuse small trees or shrubs).
4. Trees not flowering in juvenile leaf condition; juvenile leaves sessile, often slightly cordate at base but not perfoliate; fruit similar to that of *E. viminalis*.
5. *Juvenile foliage slightly glaucous; mature leaves shining, lanceolate to broad lanceolate, often falcate, mostly above 12 cm. long; branchlets and umbels not glaucous*; buds and fruit as in *E. viminalis*. Commonly found growing in association with *E. pauciflora* above 3500 ft. Also south-eastern New South Wales, Victoria, and Tasmania. 'Mountain Gum'.

2. *E. dalrypleana* Maiden subsp.
dalrypleana

- 5a. *Juvenile foliage very glaucous; adult leaves dull not shining, narrow lanceolate to lanceolate, if mostly more than 12 cm. long, then narrow; branchlets, umbels, buds, and at least the young fruit more or less glaucous (from slightly so to almost white); buds and fruits similar to those of two above. Tree marginal to dry sclerophyll forest or on drier slopes of the mountains. Found from south-eastern Queensland through eastern New South Wales to Victoria, Tasmania, and South Australia. 'Candle Bark'.*

3. *E. rubida* Deane et Maiden

- 4a. Small tree or shrub of high elevations; leaves, branches and buds often highly glaucous, less so when upper leaves take adult form but juveniles continued for an indefinite number of pairs, 5-6 × 3-4 cm. but finally changing to adult type and lanceolate acuminate; fruit with a narrow rim above which valves scarcely project. Rare in the A.C.T., recorded only from Mt Coronet, upper Cotter Valley; montane areas of New South Wales, Victoria, and Tasmania. 'Silver-leaved Mountain Gum'.

4. *E. perriniana* F. Muell. ex
Rodway

- 2a. Leaves opposite and commonly less than 3 times as long as broad; foliage, buds and fruits glaucous (or subglaucous when older); small trees of shrubby and diffuse habit.
6. Leaves perfoliate or uppermost free and becoming alternate and narrower; buds and fruits sessile; top of bud hemispherical (see above).

4. *E. perriniana* F. Muell. ex
Rodway

- 6a. Leaves not perfoliate; buds narrowed below, fruits on short pedicels; top of bud conical;

small tree with rough fibrous bark or bushy shrub. In dry sclerophyll areas near Tumut, Lake George and north to Central Tablelands of New South Wales, widely planted in and near Canberra but natural occurrence doubtful. 'Argyle Apple'.

5. *E. cinerea* F. Muell. ex Benth.

1a. Buds and fruits more than 3 per umbel, anthers various.

7. Tops of the buds as long as or longer than the base (excluding pedicel).

8. Rim of the fruit sloping upwards to the projecting valves and, except in *E. mannifera*, sometimes making $\frac{1}{2}$ the length of the fruit; leaves more than 4 times as long as broad.

9. Trees with smooth bark or with some thin rough flaky bark near base of trunk.

10. *Bark of trunk bluish-gray* or mottled (rich creamy coloured immediately after exfoliation); juvenile foliage slightly glaucous, leaves shortly petiolate and soon alternate, broadly ovate to almost orbicular; adult leaves lanceolate to broadly lanceolate, firm in texture with dull surface, 8-14 × 2-4 cm., the submarginal vein well developed; umbels axillary or on leafless portions of branchlets, 4-8-flowered; buds pedicellate, base cupular 3-4 mm. diameter, *top long-conical 6-7 mm. long, 2-3 times as long as base*, buds commonly slightly glaucous; fruit 6-7 mm. long and almost same in diameter, *well-developed rim (in fully matured fruit)* plus projecting valves making $\frac{1}{2}$ the length; valves with narrow apices broken off in many cases. Medium sized tree of woodland areas, especially on lower ground, common in such sites in the A.C.T.; eastern New South Wales and north-eastern Victoria. 'Blakely's Red Gum'.

6. *E. blakelyi* Maiden

10a. *Bark creamy-white, powdery when rubbed*, with purplish or plum-coloured patches during colder months; juvenile foliage narrow linear to oblong-lanceolate, surface dull but not glaucous, shortly petiolate; adult foliage narrow lanceolate to lanceolate, 5-14 × 1-2 cm., longer leaves usually falcate, submarginal nerve not conspicuous when dry; umbels axillary or on leafless portions of branchlets, 4-7-flowered; buds shortly pedicellate, not glaucous, 4-5 × 3-3.5 mm. the base cupular to obconical, *top about as long, hemispherical-conical and apiculate*; fruit 4-5 mm. long and only slightly less in diameter, *rim well-developed but not very prominent and, with the short broad valves, about $\frac{1}{2}$ length of base*. Common species of dry sclerophyll forest above 2000 ft and common on dry mountain slopes to above 3000 ft; also eastern New South Wales to Victoria. Sometimes affected by insects whose larvae form scrawling 'scribbles' on the bark though these are less numerous than on *E. rossii*. 'White Brittle Gum', 'Red Spotted Gum'.

7. *E. mannifera* Mudie subsp.
maculosa (R. T. Baker) L.
Johnson

9a. Trees with thick rough bark.

11. *Bark cinnamon-brown, coarsely fibrous and fissured*; adult leaves lanceolate to broadly so, 7-14 cm. long, 1.5-3 cm. wide, lateral and submarginal nerves not conspicuous; umbels 5-9-flowered, mostly axillary to leaves, peduncle more or less flattened-angular when young, pedicels as long as buds; *buds with shortly obconical base about 3 × 4 mm., the top broadly conical and then narrowed to slender tip* and longer than base; anthers opening by divergent slits which are continuous above; *fruits 8-11 mm. long*, similar in diameter; *rim conspicuous and sloping up to broadly triangular valves with which makes half the length of the fruit*. Common species of dry sclerophyll forest communities below 3000 ft, eastern New South Wales, Victoria, rare in South Australia. 'Red Stringybark'.

8. *E. macrorhyncha* F. Muell. ex
Benth.

11a. Bark greyish-brown, fissured but not fibrous; juvenile leaves glaucous, soon alternate, at first orbicular and sessile, later cordate-ovate, finally shortly petiolate and broadly ovate; adult leaves lanceolate falcate, 10-25 cm. long, 1-3.5 cm. wide, lateral and submarginal veins evident (at least when dry), oil glands conspicuous; umbels mostly axillary, 5-7-flowered, peduncle flattened-angular, pedicels shorter than buds which are 'egg in eggcup' shape, 6-7 mm. long, about 4 mm. diameter, base cupular, top obtusely conical, commonly apiculate, as long as or slightly longer than base; anthers opening by long slits, the cells lying parallel; fruit 4.5-6 mm. long, about the same in diameter, rim with narrow-pointed valves only about $\frac{1}{2}$ as long as base. Common woodland or dry forest species below 2500 ft, often near creeks or on lower slopes of woodland valleys; south-eastern Queensland, eastern New South Wales to Victoria. 'Apple Box'.

9. *E. bridgesiana* R. T. Baker

8a. Bark rough and often dark on main trunk, smooth with ribbons on upper part; juvenile leaves obovate, obtuse or emarginate, apiculate; adult leaves broadly obovate to oblong or broadly ovate, obtuse or rounded and apiculate at apex, 6-15 cm. long, 3-7 cm. wide; umbels mostly along leafless portion at bases of minor branches, 5-9-flowered, peduncle terete or slightly flattened, pedicels as long as or longer than buds; buds 7-8 mm. long, 3.5-4.5 mm. diameter, base shortly obconical with thin projecting margin surrounding the base of the top (conspicuous in immature buds), top at first narrow conical but becoming obtusely conical but apiculate and $1\frac{1}{2}$ -2 times as long as base; anthers opening by long slits with cells parallel; fruit 5-6 mm. long, about same in diameter, obconical with slightly raised rim, valves more or less level with orifice and with their narrow tips projecting and divergent after dehiscence. Not common in the A.C.T.; recorded from Dingo Dell (near north-west boundary), Coree Flats and from Blundell's Flat, usually in swampy habitats; south-eastern New South Wales and eastern Victoria. 'Broad-leaved Sally'.

10. *E. camphora* R. T. Baker

7a. Tops of buds shorter than base (except in *E. stellulata*) or, if almost as long, the valves sunken within fruit; valves level with orifice or sunken; rim of fruit either broad and flat or sloping inwards.

12. Buds sessile or appearing so with thick angular bases; anthers opening by slits into 2 parallel cells; bark thick fissured and persistent on trunk and main limbs.

13. Bark grey-brown; juvenile leaves slightly glaucous, orbicular-oblong to broadly ovate, about $\frac{1}{2}$ as broad as long; adult leaves narrow to broad lanceolate, 10-20 cm. long, 2-3 cm. wide, surface more or less glossy, not glaucous; branchlets, umbels, buds, and fruits not or slightly glaucous; umbels axillary, 5-7-flowered, peduncle stout and angular, often less than 6 mm. long; buds with base indistinguishable from angular pedicel and with it about 8-10 mm. long, 5-6 mm. diameter, top shorter than base, obtusely conical, with a minutely prominent rim at line of junction with base; fruit turbinate to cupular, slightly angular at base, 6-8 mm. long, 8-10 mm. diameter, rim only slightly raised, valves with only their narrow tips projecting. Low-branched tree of lower slopes, in sparse dry forest or woodland; uncommon in the A.C.T., occurs outside north-east boundary; eastern New South Wales and Victoria. 'Bundy'.

11. *E. goniocalyx* F. Muell. ex
Miq.

13a. Bark grey-brown to grey, coarse and thick and often deeply fissured on trunk; juvenile leaves orbicular to cordate-ovate, almost as broad as long, glaucous; adult leaves with dull or subglaucous surface, otherwise similar to those of preceding species; branchlets, umbels, buds, and fruits glaucous to highly glaucous; umbels mostly on leafless portions of branchlets, peduncle thick and flattened-angular, more than 6 mm. long by 3-4 mm. thick; buds sessile

or appearing so (rarely shortly angular-pedicellate), cylindroid and angular, 8-10 mm. long, 5-7 mm. diameter, base with scarlike ring at junction with obtusely conical or conical-apiculate top slightly greater in diameter than base (fully developed bud) and more than $\frac{1}{2}$ as long; fruit turbinate-campanulate to cylindroid-cupular, 8-10 mm. long, 7-8 mm. diameter, rim narrow, valves in orifice or slightly projecting. Tree of margins of woodlands and in dry sclerophyll communities between 1900 ft and 2500 ft especially near Tharwa, in Gibraltar Valley and southwards. More common than above from which it is often difficult to distinguish. 'Mealy Bundy'.

12. *E. nortonii* (Blakely) L.
Johnson

12a. Buds pedicellate or at least narrowed into a pedicel-like base or, if sessile, the anthers not opening in long parallel cells and the leaves with semi-longitudinal venation.

14. Anthers dehiscing through apical pores; buds with wrinkled surface when dry, top narrower than base and without conspicuous line marking junction; fruit commonly retaining a calycine ring (which formerly carried the stamens) below which the true rim slopes inwards to sunken valves.

15. Tree with bark rough (rarely thickly so) on base of trunk, flaky or smooth above and grey to creamy, sometimes rusty-reddish or (on rough parts) almost black due to exudation of kino; juvenile leaves soon alternate, petiolate, oblong to ovate, subglaucous; *adult leaves lanceolate or narrow lanceolate (sometimes with some broader leaves), acuminate, submarginal nerve often distant from basal margin so that leaf appears 3-nerved at base; umbels mostly axillary along pendulous minor branchlets, 5-7-flowered, peduncles slender, pedicels slender and often as long as buds into which they pass gradually; buds 5-8 mm. long, 4-5 mm. diameter, often slightly glaucous, surface wrinkled when dry, pyriform base longer than obtusely conical apiculate top; fruit hemispherical to pyriform, 5-7 mm. long, similar in diameter slightly narrowed to mouth which may be partly covered by persistent calycine ring; valves sunken and without slender points. The most common species of woodland areas in the A.C.T.; south-eastern Queensland, New South Wales, and Victoria. 'Yellow Box'.*

13. *E. melliodora* A. Cunn. ex
Schau.

15a. Tree with rough bark as in preceding or with almost wholly smooth cream-white bark; leaf canopy has a bluish tint at seasons of active leaf development; juvenile leaves petiolate, soon alternate, orbicular to oblong; *adult leaves subglaucous, oblong or from broadly ovate to broadly lanceolate, obtuse, apiculate, 4-7 cm. long, 2-4 cm. wide; umbels in terminal and axillary panicles, 5-7-flowered but some umbels branched; peduncles slender, pedicels slender, about as long as buds; buds 4-5 mm. long, 3-3.5 mm. diameter, otherwise similar to those of E. melliodora; fruit 4-6 mm. long, 3-4 mm. diameter, calycine ring often persistent, valves sunken. In similar habitats to E. melliodora but often extending into dry forest habitats; eastern New South Wales and Victoria. 'Red Box'.*

14. *E. polyanthemos* Schau.

14a. Anthers with divergent cells.

16. Fruit 6 mm. or less in diameter. Leaf venation not semi-longitudinal.

17. *Bark smooth, white to pale grey or creamy after exfoliation, commonly marked with conspicuous 'scribbles'; juvenile leaves sessile to shortly pedicellate, oblong to lanceolate; adult leaves petiolate, narrow lanceolate, 7-16 mm. long, 1-1.8 mm. wide; nervation obscure, oil glands not numerous or conspicuous when leaf is held up to strong light; umbels axillary or paniculate at ends of branches, often few; 5-10-flowered, peduncles and pedicels slender, young buds plus pedicels very narrow clavate, in flower base obconical, to 3.5 mm. diameter and almost as long as pedicel; fruits cupular-pyriform, 4-6 × 4-6 mm., rim almost flat but*

well-developed around small orifice with valves short and not projecting. On stony slopes with shallow soils, often in association with *E. macrorhyncha* and *E. mannifera* subsp. *maculosa*, e.g. on Black Mountain and Mt Ainslie; widespread in New South Wales but mainly on the Central and Southern Tablelands. 'Scribbly Gum'. One curious feature which aids recognition of this and separation from *E. mannifera* subsp. *maculosa* is that there are distinct 'pressure ridges' at the base of the limbs where they join the trunk.

15. *E. rossii* R. T. Baker et H. G. Smith

17a. Rough barked trees; leaves with distinct submarginal nerve and with very numerous oil glands when held to strong light, with strong peppermint odour when crushed.

18. Bark rather coarse in texture, trees commonly branched low on trunk; *juvenile leaves orbicular-cordate to cordate-ovate, sessile or subsessile, stem-clasping, glaucous; adult leaves lanceolate to broad lanceolate, 6-15 cm. long, 1.5-3.5 cm. wide*, sometimes with a median pair of nerves forming an angle of less than 45° with midrib, firm but not leathery in texture; umbels 7-15-flowered, axillary or along leafless portions of branchlets, not or rarely subglaucous, peduncles terete, pedicels slightly thicker than peduncles, about as long as turbinate bases of the buds; buds clavate, 5-6 mm. long, 3.5-4.5 mm. diameter, the hemispherical top much shorter than base and slightly less in diameter; fruit 6-7 mm. long and of similar diameter, hemispherical or pyriform, *rim well-developed but not much raised, valves in orifice but slightly projecting.* Common species of dry sclerophyll forest margins at low altitudes and of dry mountain slopes to 4000 ft; eastern New South Wales and Victoria. 'Broad-leaved Peppermint'.

16. *E. dives* Schau.

18a. Bark rough but of fine texture; *juvenile leaves narrow-lanceolate, lanceolate, subglaucous or dull, shortly petiolate, not stem-clasping; adult leaves narrow lanceolate to lanceolate, 6-15 cm. long, mostly less than 1.5 cm. wide, thin and soft in texture with dull slightly bluish colouration;* umbels axillary or along leafless portions towards bases of branches, 7-21-flowered, peduncles and pedicels slender, buds slender clavate, about as long as pedicels, 4.5-6 mm. long, 2.5-3.5 mm. diameter, top shorter than base and conical; fruit 5.5-6.5 × 4.5-5 mm., pyriform, *rim narrow and sloping inwards to slightly sunken valves*, pedicel shorter than fruit. Cool shaded slopes of mountain gullies 2000 ft to 4000 ft; south-eastern New South Wales and eastern Victoria. 'Narrow-leaved Peppermint'.

17. *E. robertsonii* Blakely

16a. Lateral veins of the leaves often conspicuous and more or less semi-parallel to midrib or at least the lower ones forming a narrow angle with it, their ends linked but not or scarcely forming a continuous submarginal nerve; leaves usually thick and leathery, oil glands not always numerous or conspicuous; fruit more than 6 mm. in diameter (except in *E. stellulata*).

19. Fruit sessile or subsessile; mature adult leaves symmetrical at base, venation semi-longitudinal.

20. *Trees with smooth creamy or grey bark;* juvenile leaves ovate to broad lanceolate, glaucous, thick and leathery; adult leaves elliptical-lanceolate, shining or dull, 8-15 cm. long, 1.5-3.5 cm. wide; umbels 5-9-flowered, axillary or along leafless portions of branchlets, peduncles terete or slightly compressed, pedicels thick and short, passing gradually into the buds; *buds finally clavate, 5-7 mm. long, 4-5 mm. diameter, top obtusely conical to conical-apiculate;* fruit subglobose to pyriform, 8-10 mm. long, *slightly less or similar in diameter shortly pedicellate, rim well-developed and level with orifice or finally sloping inwards to slightly sunken valves.* A variable species with at least three forms in the A.C.T.: one form with creamy bark, red glossy branchlets and shining leaves is found along margins of grassland and woodland at lower elevations or around frost pockets in valleys, sometimes called

'White Sally'; a second form is a forest tree with grey bark often marked by close-set 'scribbles', dull leaves, subglaucous branchlets and buds, associated with *E. dalrympleana* above 3000 ft. Both are called 'Snow Gum' locally. The third form is a small tree or low shrub at high elevations with leaves dull to subglaucous, branchlets, buds, and fruit often very glaucous. This may represent *E. debeuzevillei* Maiden (angular buds) rather than *E. niphophila* Maiden et Blakely (clavate buds). These may not be distinct species. Distributed in cold montane areas of New South Wales, Victoria, south-eastern South Australia, and Tasmania.

18. *E. pauciflora* Sieb. ex Spreng.

20a. Small trees or shrubs with very dark *almost black rough bark, the limbs with smooth greenish-grey or greenish-brown bark*; juvenile leaves orbicular to oblong-ovate; *adult leaves elliptical to oblong elliptical, 4-8 cm. long, 1-2.5 cm. wide*; umbels mostly on leafless portions of the branchlets, peduncle 2-5 mm. long, 9-15-flowered; *buds sessile, slender with narrow conical top similar in size and shape (reversed) to the narrow obconical base, 5.5-6.5 mm. long, 1.5-2 mm. diameter*; *fruit subglobose, 4.5-5.5 mm. long, similar in diameter, rim forming a rounded or inward sloping edge to small orifice above sunken valves*. Growing as small trees in cold mountain valleys or shrubs in subalpine communities at high elevations; eastern New South Wales and north-eastern Victoria. 'Black Sally'.

19. *E. stellulata* Sieb. ex DC.

19a. Fruit on short pedicels, more than 6 mm. diameter; mature leaves commonly asymmetrical at base, often falcate; at least some of the lateral veins forming a narrow angle with midrib and continuing for more than half length of leaf.

21. Tall forest tree with *rough fibrous (stringy) bark on trunk and main limbs*; juvenile leaves broad lanceolate, rough or minutely toothed on margins; adult leaves broadly lanceolate, asymmetrical with broader side on outside curve when falcate, 10-20 cm. long, 2.4-5 cm. wide; umbels axillary or along leafless portions of branchlets, 7-13-flowered, peduncle slender terete, pedicels thicker passing into buds; buds clavate, 5-7 × 4-5 mm., top shorter than base, at first conical later obtusely conical-apiculate; *fruits 3-celled (rarely 4-celled), obconical to pyriform, 7-9 × 6-8 mm., rim conspicuous and flat or sloping slightly towards valves* which lie in orifice but not projecting. Forest tree of cool slopes and gullies above 3500 ft in the mountains, commonly downslope from the following species; eastern New South Wales and eastern Victoria. 'Brown Barrel', 'Cut-Tail'.

20. *E. fastigata* Deane et Maiden

21a. Tall forest tree with *rough bark (stringy) on lower ½ to ¾ of trunk, smooth creamy above and commonly marked with numerous 'scribbles'*, exfoliating in long strips from upper section; juvenile leaves broadly ovate, entire on margins, slightly glaucous; adult leaves similar to those of above, 12-20 cm. long, 2-5 cm. wide, glossy; umbels mostly along leafless portions of branchlets, 7-13-flowered, peduncles terete, pedicels passing into the obconical-turbinate bases of the buds which are 6-7 mm. long by 4.5-5.5 mm. diameter, hemispherical apiculate top about ½ as long; *fruits pyriform, 8-10 mm. long and little less in diameter, narrowed to the orifice around which the rim slopes inwards to the slightly sunken valves, 4-5-celled*. Cool damp upper slopes at slightly higher levels than preceding and dominating wet sclerophyll forest communities; also south-eastern New South Wales, Victoria, and Tasmania. 'Alpine Ash', 'Gum-topped Stringybark'.

21. *E. delegatensis* R. T. Baker

ONAGRACEAE

1. Perennial herbs with creeping rhizomes; petals pink.

1. *Epilobium*

1a. Biennial herbs with erect or ascendent stems; petals yellow, turning orange or red on withering.

2. *Oenothera*

1. *EPILOBIUM* L.

1. Stems branched, clothed with sparse spreading glandular hairs or later glabrescent, internodes often more than 3 cm. long (to 10 cm.), young parts clothed with mixed glandular and appressed hairs; leaves opposite at lower nodes, alternate above, very shortly petiolate or subsessile, 2.5-6 cm. long, lanceolate, abruptly narrowed at base, acuminate, margin with distant minute callous teeth; flowers in upper axils of main and lateral branches, ovary with appressed curved hairs mixed with glandular ones, calyx lobes 3.3-5 mm. long, sparsely hairy, petals pink, 4-5 mm. long, sinus about 1.5 mm. deep, capsule 7-9 cm. long, more or less glabrescent, slender peduncle 1.5-3 cm. long; seeds striate due to longitudinal rows of pale papillae, the flattened face without papillae, median ridge evident, $1.25 \times 0.4-0.5$ mm., apex a minute non-papillose swelling to which the numerous hairs are attached. An introduced species, native to North America, which is sometimes found in nurseries and gardens. Fig. 268D (seed).

1. **E. adenocaulon* Hausskn.

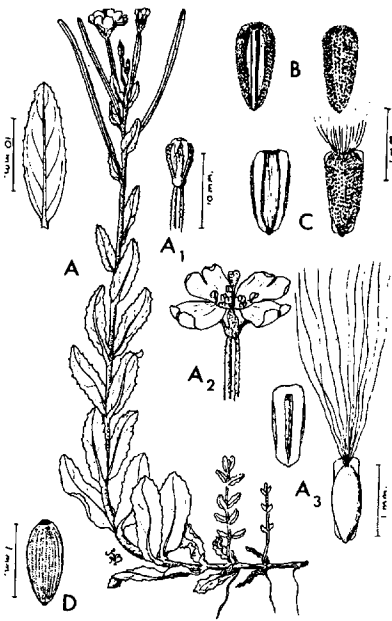
1a. Ascendent herbs, stems mostly simple above base, internodes rarely as long as 3 cm. and commonly less than 2 cm. (if more then the leaves mostly opposite and stems without glandular hairs). In the following, except *E. hirtigerum*, the younger parts, the flowers and capsules and to a lesser extent the stems and leaves are clothed with curved more or less appressed hairs. A few glandular hairs may be present, especially towards the summit of the young capsules and bases of the calyces; seeds not conspicuously striate longitudinally.

2. Leaves alternate or only a few basal ones opposite; seeds papillose on the rounded back and sides but without pale inflated margins.

3. Softly villous with spreading hairs, leaves linear to oblanceolate, minutely toothed in upper half or only near obtuse apex, 1.5-5 cm. long, 2-8 mm. wide; flowers in upper axils; calyx lobes 4.4-5 mm. long; petals white, pink or (dry) pale violet, 5.5-5 mm. long, sinus about 1.5 mm. deep, stigma 2 mm. long, style as long; capsule to 6 cm. long, peduncle 6-12 mm. long; seeds $1-1.25 \times 0.5$ mm. In damp or swampy sites near Canberra, Hall, the Booroomba area, and adjacent to Corin Dam road above Gibraltar Falls; also south-eastern Australia, Tasmania, and New Zealand.

2. *E. hirtigerum* A. Cunn.

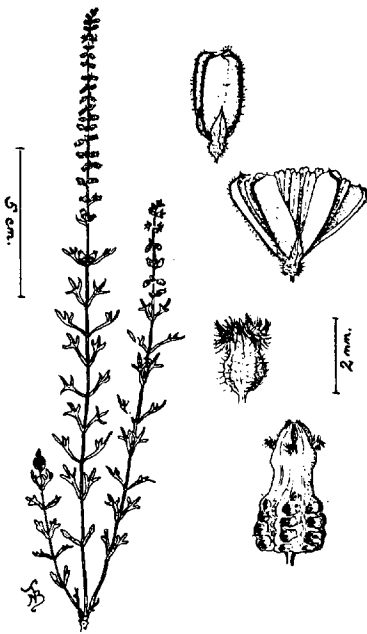
3a. Pubescent with appressed or short curved hairs, erect stems commonly with short leafy shoots in the axils of most leaves; leaves pubescent on both faces at least when young (sometimes very sparsely so), later glabrescent except on margins and nerves, linear, elliptical, oblong or narrow oblanceolate, margins toothed except near base, 1-6 cm. long. younger leaves with subulate apiculum; flowers in upper axils, variable in size, smaller on late season secondary shoots. Widespread variable species commonly referred to *E. junceum*, a name which has been inconsistently used and is hence a *nomen confusum*. Local plants tend to fall into two groups though separation is not always clear cut. At lower elevations the plants are associated with disturbed sites such as roadside ditches, gardens, water courses in cleared areas etc. The erect stems are stiff and, owing to loss of the primary leaves, may bear only short lateral tufts of small leaves about 1 cm. long on which the secondary nerves are obscured. The flowers have calyx lobes 3-4 mm. long and petals 5-6 mm. long. At higher elevations plants grow in swampy sites and are more herbaceous and ascendent, the nervate primary leaves persist and there are short axillary shoots in many lower axils. The leaves are commonly glabrescent and even when young the hairs are mostly confined to margins and nerves. Calyx lobes 6-8 mm. long, petals to 10 mm. long. In the A.C.T. this is common



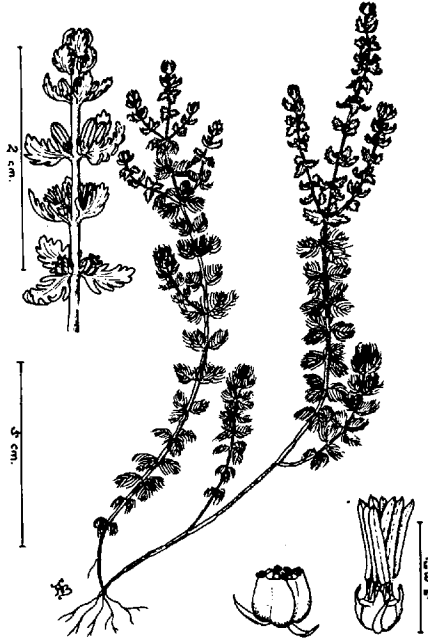
268. A. *Epilobium sarmentaceum*
 B. *Epilobium cinereum*
 C. *Epilobium gunnianum*
 D. *Epilobium adenocaulon*



269. *Oenothera striata*



270. *Haloragis heterophylla*



271. *Myriophyllum verrucosum*

at most elevations, also widespread in temperate Australia, Tasmania, and New Zealand. 'Hairy Willow Herb'. Fig. 268B (seed).

3. *E. cinereum* A. Rich.

2a. Leaves mostly opposite, alternate towards upper parts of stems, pubescent on nerves and margins; short axillary shoots usually absent, later branches developed from leafless basal parts of stems; *seeds with pale inflated margins*.

4. *Leaves oblong-elliptical to oblanceolate, usually narrowed to base* (rarely broadly lanceolate), 1-4 cm. long, lower ones sometimes very shortly petiolate, margins commonly undulate but *teeth rarely more than callous swellings*; calyx lobes 4-6 mm. long, *rugose-wrinkled at least in the upper half*, commonly reddish-purple; petals pink, 7·5-8 mm. long, notched to $\frac{1}{3}$ of length but sinus narrow (when fresh); stigma 2-2·5 mm. long, style slightly longer; capsules commonly reddish-purple, 4-6 cm. long; *seeds ellipsoid, slightly curved, apparently smooth, pale margin visible towards base (from back) and extended beyond apex with narrow area of attachment for the hairs*. Not easily distinguished from the following in the absence of seeds though more common at higher elevations or in colder sites, Snowy Flats (Mt Gingera), Murray's Gap, upper waters of Gibraltar Creek. Previously regarded as endemic to Tasmania but also present on Mt Kosciusko. Fig. 268A-A₃.

4. *E. sarmentaceum* Hausskn.

4a. *Leaves lanceolate to ovate, sessile or subsessile, broad at point of attachment*, 2-4·5 cm. long, margins often undulate, *minutely toothed, teeth with callous apices*; calyx lobes 6-8 mm. long, rarely rugose-wrinkled towards apices, commonly smooth, petals pink, 10-15 mm. long, notch often shallow with sinus wide, stigma 2·5-3 mm. long, style sometimes long (to 10 mm.); capsules 5-7·5 cm. long; *seeds papillose, obtusely obovoid, hairs attached across broad apex, pale margins visible from back only towards base*. In swampy sites in mountain gullies and swamps at high elevations, Mt Coree, Cotter Valley, Mt Gingera; also south-eastern New South Wales, Victoria, and Tasmania. Fig. 268C (seed).

5. *E. gunnianum* Hausskn.

2. **OENOTHERA** L.

1. Annual or biennial herb to 1 metre or more in height; pubescent with short blunt hairs mixed with *long hairs without bulbous bases*; leaves narrow linear-lanceolate, the radical ones attenuate at base, 12-20 cm. long, 6-8 mm. wide, margins distantly callous-toothed, midrib conspicuous; upper leaves with clasping base; flowers spicate in axils of leafy bracts; *sepals villous, turning red; petals 3-4 cm. long, yellow turning red; capsule broadest in uppermost third, villous with long and short hairs, 2·5-3 cm. long; seeds without comal hairs*. On waste ground near Canberra; of Chilean origin but naturalised in southern Australia, Tasmania, and New Zealand. 'Evening Primrose'. Fig. 269.

1. **O. striata* Ledeb. ex Link

1a. Robust perennial herb to 2 metres high, pubescent with short glandular hairs mixed with *long hairs that have red bulbous bases*; leaves broad, basal ones broadly elliptical-lanceolate and petiolate, their margins crinkled and distantly toothed; stem leaves elliptical to ovate-lanceolate, shortly petiolate or subsessile, 10-15 cm. long, 2-3·5 cm. wide, distantly toothed; flowers in rather dense terminal spike, bracts leafy; *sepals pubescent with sparse long hairs, veins red; petals 4-5 cm. long, remaining yellow; capsule 2·5-3·5 cm. long, narrowed upwards, pubescent with red-based longer hairs; seeds without comal hairs*. Country of origin doubtful, widespread in northern temperate regions, naturalised in Australia; occurs in similar sites to the preceding in the A.C.T. but less common. 'Evening Primrose'.

2. **O. erythrosepala* Borbas

HALORAGACEAE

1. Land plants; leaves entire or toothed, opposite or alternate.

1. Haloragis

1a. Aquatic plants, submerged or growing on exposed mud; leaves commonly whorled (opposite in *M. pedunculatum*) with the submerged ones subdivided into filiform segments.

2. Myriophyllum

1. HALORAGIS J. R. et G. Forst.

1. Erect herbs, fruit ribbed and tuberculate, sometimes pitted; petals more than 1.5 mm. long and usually more than 2 mm. except in uppermost flowers.

2. Erect or ascendent perennial herb; *hispid with loose spreading septate hairs; leaves alternate, linear-elliptical to narrow oblanceolate, 1-3 cm. long, margins recurved or revolute, entire or toothed towards acute apex; upper part of plant paniculate with branches and flowers subtended by leafy bracts; flowers solitary between narrow acuminate bracteoles; calyx lobes triangular-ovate, about $\frac{1}{2}$ as long as the wrinkled-tuberculate torus but less than $\frac{1}{4}$ as long as boat-shaped petals which are 2.5-3 mm. long, all parts scabrid to hispid; fruit ovoid, constricted below calyx lobes, rugose-tuberculate, obscurely ribbed. South-eastern Queensland to Victoria and South Australia; not common in the A.C.T. but occurs on Mt Ainslie. 'Hairy Raspweed'.*

1. *H. elata* A. Cunn. ex Fenzl

2a. Perennial herbs with opposite leaves (upper leaves sometimes alternate); flowers spicate on simple or sparsely branched stems.

3. *Stems scabrid or hispid with short appressed simple hairs; leaves ovate to elliptical, margin toothed and slightly recurved, 6-12 mm. long; flowers in loose terminal spike, solitary in axils of small bracts (the lower ones leafy); petals purplish or red, about 2 mm. long, hispid on back, each covering 2 long anthers; purple plumose stigmas developing after petals and anthers fall; fruit subglobose, topped by persistent triangular sepals, tuberculate between the ribs. Common in dry sclerophyll habitats on shallow stony soil; from south-eastern Queensland to Tasmania and South Australia. 'Raspweed'.*

2. *H. tetragyna* (Labill.) J. D. Hook.

3a. *Stems simple or few; commonly glabrous but sometimes sparsely scabrid; leaves variable, simple and narrow linear or terminating in 3 narrow lobes of similar length or almost pinnatifid, 1-3 cm. long, 1-2 mm. wide; inflorescence terminal, flowers pedicellate and 1-4 in axils of small bracts. Flowers as in preceding but petals sometimes less than 2 mm. long; fruit urceolate, tuberculate and sometimes pitted, sepals lanceolate-acuminate. Common in low ground or swampy areas or in woodland; south-eastern Queensland to Tasmania and South Australia. 'Perennial Raspweed'. Fig. 270.*

3. *H. heterophylla* Brongn.

1a. Ascendent or prostrate herbs; leaves opposite; apart from ribs, fruits smooth except under high magnification, glossy; petals less than 2 mm. long and commonly about or less than twice as long as sepals.

4. Low rhizomatous perennial with tangled *glabrous stems; leaves broadly ovate to almost orbicular, obtuse, rarely more than 5 mm. long, about 3 mm. wide; margins serrate, thick below; stems terminating in leafless dark red or purplish racemes; flowers pendulous, about 1.5 mm. long, alternate or subopposite, solitary in each bract axil, bracts minute; fruit subglobose or ellipsoid, sepals ovate, more than $\frac{1}{2}$ as long as torus on which the alternate*

ribs may be minutely scabrid. Very common at higher elevations especially in swampy sites; New South Wales to Tasmania and South Australia, also New Zealand and Asia. 'Creeping Raspsweed'.

4. **H. micrantha** (Thunb.) R.Br.
ex Siebold et
Zucc.

4a. Prostrate, older stems woody and subshrubby, stems mostly from central rootstock but rooting at nodes; *scabrid or subglabrous*; leaves *oblong or ovate-lanceolate, shortly petiolate*, 6-10 mm. long, opposite, acute, margins serrate, thickened below; all stems ending in short leafy inflorescences; *erect flowers sessile in axils of leafy bracts* and about 2.5 mm. long; fruit ellipsoidal, ribbed, *surface minutely scabrid-punctulate*, persistent sepals broadly ovate. Less common than **H. micrantha** in the A.C.T., growing at high elevations at upper levels of Mt Gingera and in the Upper Cotter Valley. Has been referred to **H. depressa**, of which the Australian material is now referred to **H. serpyllifolia** (J. D. Hook.) Walp. but from the more robust habit, septate hairs and scabrid-papillose angular torus approaches a form described as **H. montana** J. D. Hook.

5. **H. serpyllifolia** (J. D. Hook.)
Walp.

2. MYRIOPHYLLUM L.

1. Leaves whorled, submerged lower ones much subdivided.

2. Submerged or exposed on water margin; leaves in whorls of 4-6, submerged ones pinnatisect with filiform segments, *emergent and floral leaves narrow with lateral segments reduced to small projecting lobes or teeth or entire*; flowers axillary, those in upper axils male, lower ones female; fruit splitting into 4 ovoid nutlets which are tuberculate or rough on the back. Common in shallow water or swamps and pools; often reddish when exposed on mud; widespread in southern Australia, Tasmania to New Zealand. 'Water Milfoil'.

1. **M. propinquum** A. Cunn.

2a. Similar to above but *emergent and floral leaves ovate or oblong with upward sloping (not spreading) lobes or entire*; fruit similar. In similar sites, widespread throughout Australia and Tasmania. 'Water Milfoil'. Fig. 271.

2. **M. verrucosum** Lindl.

1a. Small perennial herb of swampy ground or shallow water; stems simple or with few branches, commonly tangled; leaves *opposite*, in rather distant pairs, linear and (in local plants) *less than 6 mm. long*; flowers red, apical pair male with 4 red petals and 8 large anthers on filaments which later elongate; lower flowers female and without petals. Common in swamps in cold valleys or in sphagnum swamps at high elevations; also New South Wales, Victoria, Tasmania, New Zealand, and New Guinea.

3. **M. pedunculatum** J. D. Hook.

UMBELLIFERAE (APIACEAE)

1. Umbels simple (cymose-paniculate in **Trachymene anisocarpa**) or the flowers in dense heads.

2. Flowers in simple umbels arising singly or umbels arranged in terminal cymose panicle.

3. Leaves palmate or palmately subdivided, commonly orbicular or broadly cordate-reniform; fruits laterally compressed.

4. Stipules scarious.

1. **Hydrocotyle**

4a. Stipules lacking.

2. **Trachymene**

3a. Leaves not palmate; fruit not strongly laterally compressed.

5. Leaves pinnately dissected and aromatic; plants with radical and stem leaves.

3. Oreomyrrhis

5a. Leaves reduced to slender linear-terete septate 'phyllodes'; swamp or aquatic plants with creeping stems rooting at the nodes.

4. Lilaeopsis

2a. Flowers in dense heads or short spikes.

6. Bracts and leaf segments with pungent pointed apices; plants (or at least the heads) bluish.

5. Eryngium

6a. Bracts broad and softly tomentose; leaf segments obtuse, not pungent pointed.

6. Actinotus

1a. Umbels compound (i.e. in umbellate umbels) or appearing paired or clustered (leaf opposed) where the common peduncle is lacking.

7. Leaves simple, lanceolate; ribs of fruit wrinkled-rugose; plants subshrubby.

7. Platysace

7a. Leaves compound or if simple then elongated and linear-terete; plants herbaceous.

8. Fruits covered with slender soft or stiff bristles tipped with minute reflexed hairs; slender annual.

8. Daucus

8a. Fruits without slender bristles.

9. Stems branched, leaves subdivided and mostly along the stems, early radical ones generally withering before flowering is much advanced; annual, biennial, or short-lived perennials.

10. Leaves with flat toothed segments.

11. Stems with purple mottling, often strongly mouse-scented; flowers white.

9. Conium

11a. Stems striate, without mottling, not odoriferous; flowers yellow.

10. Pastinaca

10a. Leaves with filiform or very narrow linear entire segments.

12. Plants strongly aromatic; compound umbels well-developed; flowers yellow.

13. Stems erect to 2 metres high, usually tufted; leaves aniseed-scented; fruit somewhat compressed laterally.

11. Foeniculum

13a. Stems simple at base, branched and spreading above, dichotomously corymbose, to 1 metre high, leaves dill-scented; fruit with seeds compressed from the back.

12. Anethum

12a. Plants not strongly aromatic, often small and much less than 1 metre high (local species); umbels sometimes appearing simple but in leaf opposed pairs; minute petals whitish.

13. Apium

9a. Leaves all or almost all radical, simple or pinnate or bipinnate; plants perennial with the butts deep set in the soil.

14. Densely tufted, bases of old leaves forming a fibrous or flaccid covering at the butt; leaves apparently jointed or septate.

14. Aciphylla

14a. Slender plants; old leaf bases not persistent; leaves not septate.

15. Seseli

1. HYDROCOTYLE L.

1. Perennial herb, stems stoloniferous or the leaves apparently single but arising from deep set rhizomes, stipules scarious and obtuse; petioles hirsute, shorter on upper leaves,

blades orbicular or reniform-cordate, 1-3 cm. in diameter, deeply and broadly notched at base, crenately lobed; umbels on hirsute peduncles usually longer than leaves; *flowers numerous, unisexual, males on longer pedicels than females and in different umbels*; fruit glabrous, compressed but not flat, without conspicuous ribs, 2-2.5 mm. broad. Common in pastures, waste ground, woodland, and dry forest, often persistent in gardens where the unpleasant odour when wet may be noticed; widespread in south-eastern Australia and Tasmania. 'Stinking Pennywort'. Fig. 272.

1. *H. laxiflora* DC.

1a. Flowers bisexual, not numerous in umbels.

2. Stolons and stems forming a close mat and rooted at nodes; vestiture variable with plants clothed with flaccid bristles or hairs limited to stems, petioles and upper leaf surfaces or wholly glabrous; *stipules entire or ragged on margins; leaves orbicular, cordate or reniform, crenate or with 5-7 shallow crenate lobes, 7-15 mm. diameter*; umbels on slender peduncles (enclosed by stipules when young); flowers less than 12 and commonly 4-6 per umbel; fruit about 1.5 mm. diameter, laterally compressed, carpels with lateral ribs. In wet ground under shrubs in damp situations, local plants commonly glabrous or almost so; also Queensland to Tasmania.

2. *H. peduncularis* R.Br. ex A.
Rich.

2a. Habit similar to that of preceding; *stipules entire; leaves divided to base into 3 lobes of which the laterals are broad and deeply bilobed so that leaf appears 5-lobed; margins crenate*; flowers and fruits similar to those of preceding species. In similar habitats but less common, found in southern parts of the A.C.T. Under revision and wider distribution uncertain.

3. *H. aff. tripartita* R.Br. ex A.
Rich.

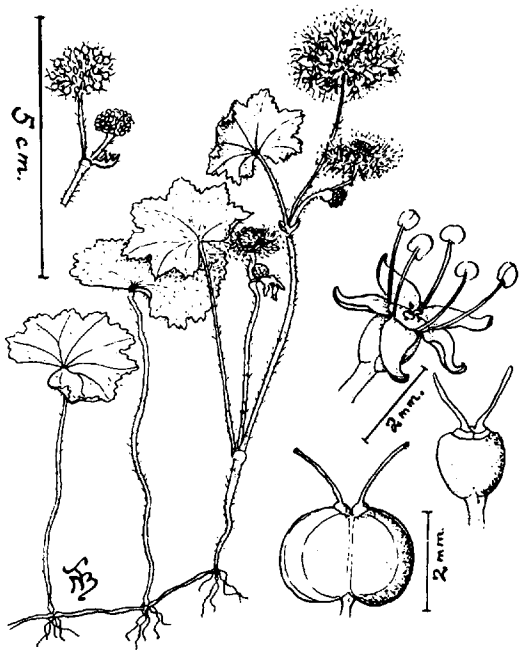
2. TRACHYMENE Rudge

1. Perennial herb, leaves all radical; petioles long and slender, ciliate with lax hairs at base; *blades ovate, usually 3-lobed but with other (often asymmetrical) lobing on some, 1.5-2.5 cm. long*, glabrous or with few hairs; umbels on peduncles as long as or longer than leaves and *arising from base*, linear bracts subtending numerous flowers, pedicels slender, 4-7 mm. long; sepals minute, petals white or pinkish; fruit broader than long, flattened laterally, mature carpels 2-3 mm. diameter, one often abortive. At high elevations in alpine woodland; e.g. Blackfellow's Gap, Mt Bimberi; also New South Wales, Victoria, and Tasmania. Fig. 273.

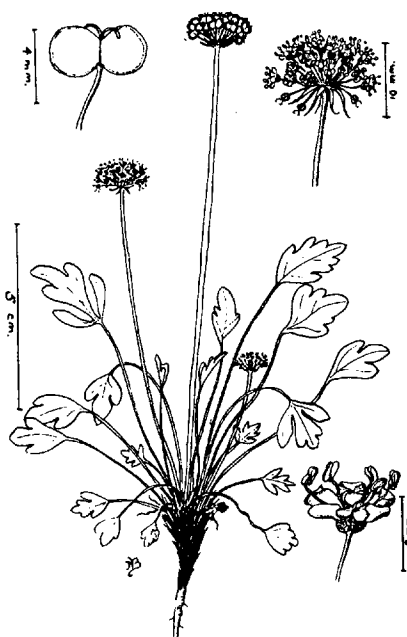
1. *T. humilis* (J. D. Hook.) Benth.

1a. *Robust annual or biennial herb with erect glabrous stems*; leaves radical and along stem but uppermost reduced, radical ones with more or less setose-hirsute petioles (to more than 20 cm. long), *blades orbicular-ovate in outline but deeply pinnatisect*, to more than 12 cm. across, the 3 main lobes again lobed, *margins serrate*, more or less setose especially on nerves of lower surface; uppermost leaves reduced to 1-3 linear-elliptical lobes but broader base of petioles setose-ciliate; *umbels often numerous* in a large subumbellate cymose panicle with stiff peduncles subtended by narrow simple leafy bracts; *bracts of umbels connate at base*, slender, shorter than flowers, glabrous or with few marginal setae; petals white; in fruit the *connate base of bracts cupular around base of pedicels* which lengthen to about 2 cm. long, mericarps turning dark brown, 3.3.5 × 2.2.5 mm. but one sometimes abortive or smaller. The only A.C.T. record is from the vicinity of the Bendora Dam. The specimen agrees closely with the description of *Didiscus compositus* Domin, which is usually treated as a synonym of a widespread species occurring from Western Australia to eastern New South Wales and Tasmania.

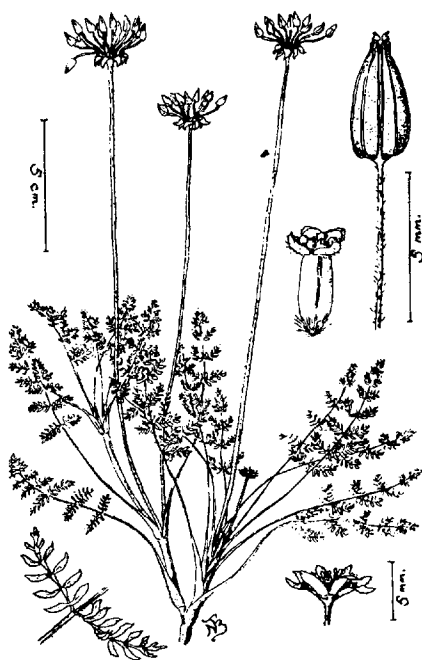
2. *T. anisocarpa* (Turcz.) B. L.
Burt



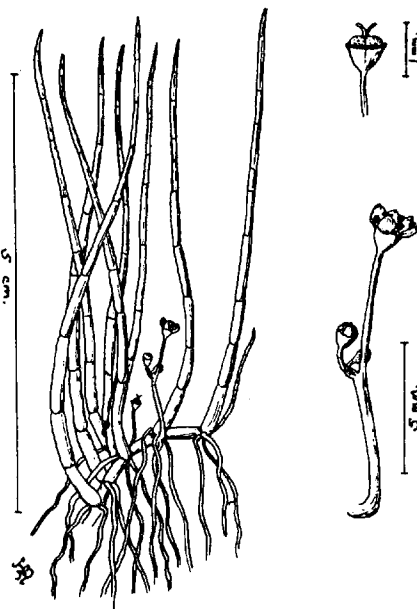
272. *Hydrocotyle laxiflora*



273. *Trachymene humilis*



274. *Oreomyrrhis eriopoda*



275. *Lilaeopsis polyantha*

3. **OREOMYRRHIS** Endl. See *Mathias and Constance (1955)*

1. Perennial herb with spreading radical leaves, *densely silvery-silky hairy, hairs appressed*; leaves doubly pinnatisect and much dissected; *peduncles stout*, rarely more than 7-10 cm. long in fruit; shorter in flowering stage; bracts sericeous, pedicels as long as or slightly longer than bracts (in fruit) and villous like peduncles; flowers minute; fruits 4-5 mm. long, glabrous or with few scattered hairs above, carpels turning purple-brown. Amongst grasses in habitats marginal to sphagnum swamps at high altitudes, e.g. Mt Ginini; less aromatic than the following species; also eastern New South Wales, Victoria, and Tasmania. 'Silvery Carraway'.

1. **O. argentea** J. D. Hook.

1a. Loosely tufted perennial herbs with radical leaves and more or less branched leafy stems. Hairy but not sericeous or silky, the hairs appearing sparse except under a lens.

2. Leaves twice pinnatisect, the *segments sparsely hirsute*; peduncles slender but stiff (in fruit), conspicuously longer than leaves, hirsute or villous; *bracts with appressed hairs on both surfaces*, pedicels finally longer than bracts and villous; fruits reddish or purplish-brown, glabrous, 4-6 mm. long. Occasional at low altitudes but common in subalpine forest and swampy habitats in the mountains; the most common local species and also found in New South Wales, Victoria, South Australia, and Tasmania. Mathias and Constance report a chromosome count of $n = 6$. 'Wild Carraway'. Fig. 274.

2. **O. eriopoda** (DC.) J. D. Hook.

2a. Similar to **O. eriopoda** but plants highly aromatic; leaves and stems less hirsute, the *leaf segments and bracts ciliate on margins only*; peduncles slender and longer than leaves (in fruits); fruit glabrous, 4-5 mm. long. In swampy ground at high elevations or in alpine woodland; less common than **O. eriopoda** but with similar distribution in eastern New South Wales, Victoria, and Tasmania.

3. **O. ciliata** J. D. Hook.

4. **LILAEOPSIS** Greene See *Hill (1927)*

Aquatic herb in running water; leaves terete and septate (sometimes regarded as phyllodes), glabrous, 5-15 cm. long, about 1 mm. diameter at base, less above; peduncles much shorter than leaves (1-3 cm. long); flowers few on pedicels up to 1 cm. long; fruit (not observed in local specimens) 2-3 mm. long and about $\frac{1}{2}$ as broad, mericarps ribbed, the ribs at the commissure thick and corky. Plants collected in upper waters of Naas Creek and bearing flowers but not fruits may belong to this species. Fig. 275.

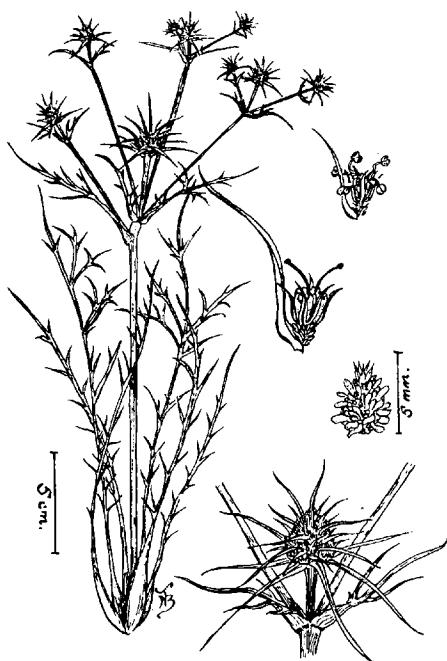
L. polyantha (Gandoger) Hj.
Eichler

Note: The more robust **L. fistulosa** A. W. Hill has been recorded from near Lake Bathurst, east of Tarago, New South Wales.

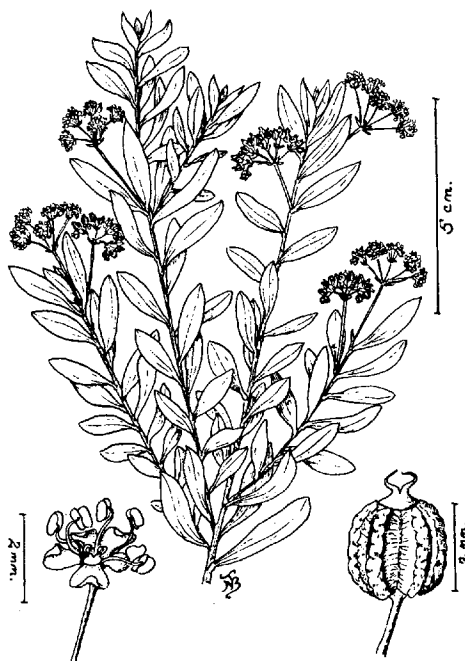
5. **ERYNGIUM** L.

1. Erect branched glabrous herb to 60 cm. high often metallic blue in hue, especially on upper parts; radical leaves with broad clasping bases, septate, simply or compoundly pinnate; linear-terete and subsucculent, the narrow lateral segments pinnate or trifid and pungent-pointed; stem leaves shorter with reduced lobing, uppermost sub-opposite; umbels in cymose panicles; flowers densely crowded in globose to ovoid heads subtended by pungent-pointed linear bracts and with smaller bracts subtending the flowers; calyx lobes blue, pungent-pointed; petals blue, the upper half inflexed and with broad ciliate or ragged apex; ovary covered by bladderly outgrowths slightly enlarged on ovoid fruit which is about 4 mm. long. Common in grassland near Canberra, flowering mid-summer; widespread in temperate Australia, localised in Tasmania, also South America. 'Blue Devil'. Fig. 276.

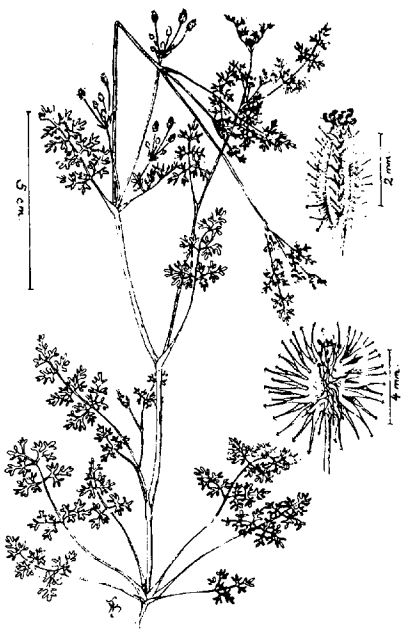
1. **E. rostratum** Cav.



276. *Eryngium rostratum*



277. *Platysace lanceolata*



278. *Daucus glochidiatus*



279. *Conium maculatum*

1a. Tufted herb, main stem short, branches prostrate and stoloniferous; radical leaves broad at base, septate above with petiole-like portion and narrow linear-oblong to oblanceolate blade bordered by narrow pungent-pointed teeth or lobes; stem leaves shorter, opposite, oblanceolate and deeply lobed or 3-lobed with lanceolate lobes; flowers dense in shortly pedunculate heads smaller than in preceding, solitary with each leaf pair or solitary from between radical leaves; flowers smaller than but similar to those of preceding. Uncommon in the A.C.T. but occurs in Tidbinbilla Valley, the radical leaves longer and narrower than in Victorian and Tasmanian plants; also found in New South Wales, South Australia, and New Zealand.

2. *E. vesiculosum* Labill.

6. *ACTINOTUS* Labill.

Erect herb, plumose-stellate tomentose on all parts; leaves twice 3-partite with obtuse linear lobes rarely more than 5 mm. long, greenish above with stellate hairs, white or rusty tomentose below; umbels head-like, on long peduncles, terminal or in axils of reduced leaves, surrounded by elliptical-lanceolate white or creamy bracts 2-4 cm. long, apices green; flowers much shorter than bracts, outer ones male, inner bisexual; pedicels filiform; calyx lobes membranous, long ciliate; fruit to 4 mm. long, densely silky-hairy. This species is more common in coastal areas of eastern Australia than in the A.C.T. where there is a record of it being found on Mt McKeahnie. 'Flannel Flower'.

A. helianthi Labill.

7. *PLATYSACE* Bunge

Small shrub to 1 metre high, branchlets scabridulous; leaves alternate, linear-elliptical, lanceolate or oblong, acute or obtuse, 2-3 cm. long, 4-7 mm. wide, with 2 lateral nerves semi-longitudinal in lower half; umbels compound, usually not much longer than leaves; petals white or creamy; fruit as long as broad (approx. 2 mm.) and wrinkled rugose when ripe. Forested areas at higher levels in the mountains, in scrub near rock outcrops; south-eastern Queensland to Victoria. Fig. 277.

P. lanceolata (Labill.) Druce

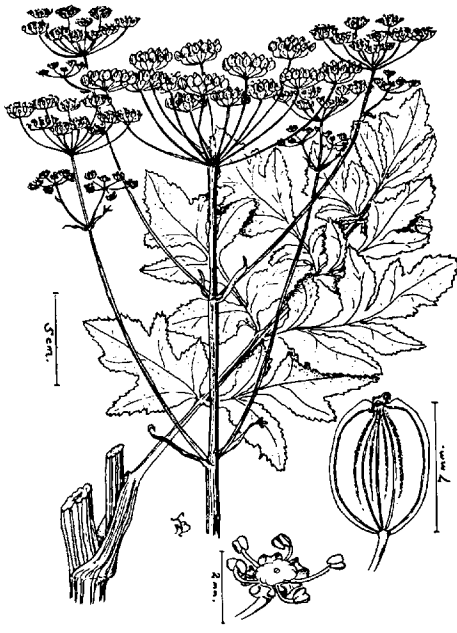
8. *DAUCUS* L.

Slender diffuse annual, hirsute with bristly hairs; leaves doubly pinnatisect, radical and lower leaves with long slender petioles, upper leaves shorter, petioles stem clasping; umbels sometimes appearing clustered in the leaf axils, rays unequal, common peduncle short or absent; flowers pedicellate, minute, petals purple (local form), reflexed, persistent between erect calyx lobes; fruit to 5 mm. long, each mericarp with 4 rows of projecting 'bristles' which in local plants may be soft and flaccid, not coalescent at base or scarcely so, the long slender apices tipped with minute reflexed bristles. Common throughout temperate and arid areas of Australia and divisible into a number of forms; the local form is common in woodland and forested habitats in the A.C.T. 'Australian Carrot'. Fig. 278.

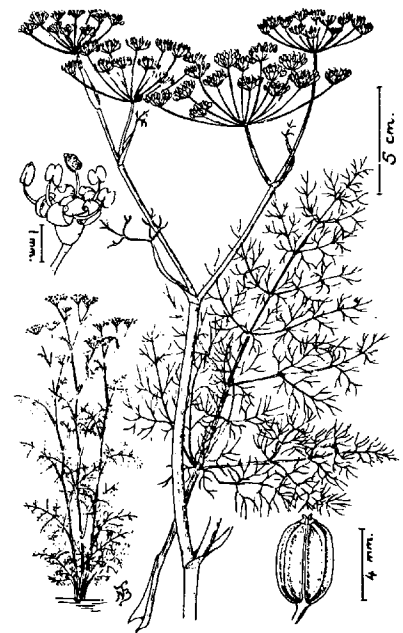
D. glochidiatus (Labill.) Fisch. *et al.*

9. *CONIUM* L.

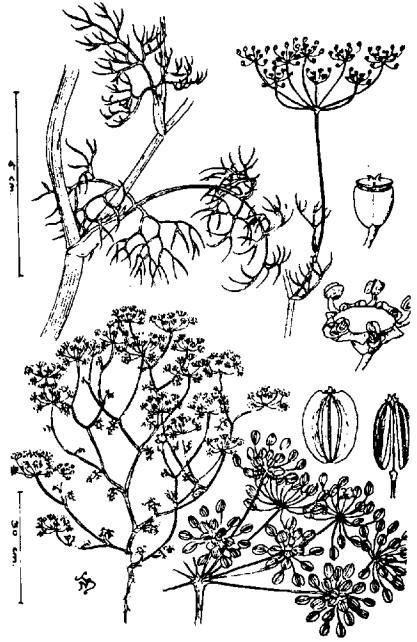
Robust herb with erect stems to 1.5 metres high, strongly mouse-scented and mottled with purple; leaves large, compoundly pinnatifid or pinnatisect with flat segments, lower petioles long with sheathing bases, upper shorter with narrower bases; umbels compound, terminal and from upper axils in large corymbose panicle, with few linear involucre bracts at summits of main and subsidiary peduncles; petals white, apices inflexed; fruit about 3 mm. in diameter, each mericarp with 5 conspicuous ribs slightly undulate along their margins. Poisonous and a declared noxious weed in all Australian States; common along



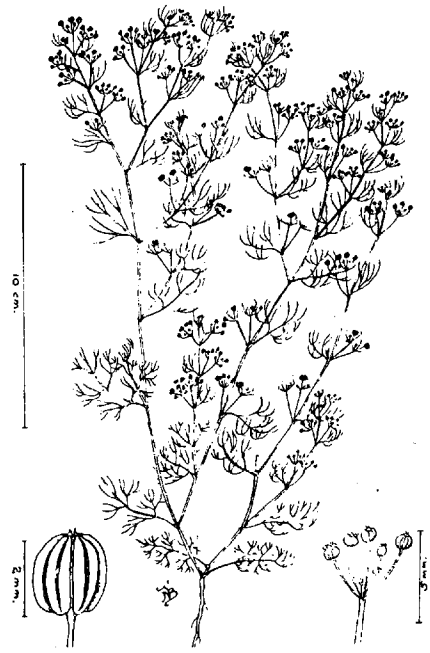
280. *Pastinaca sativa*



281. *Foeniculum vulgare*



282. *Anethum graveolens*



283. *Apium leptophyllum*

the banks of the Murrumbidgee and other rivers, sometimes mistakenly grown in gardens. Of European origin. 'Hemlock'. Fig. 279.

***C. maculatum L.**

10. PASTINACA L.

Erect biennial herb to 1.5 metres high, more or less pubescent; stems striate, hollow between nodes; leaves pinnate with ovate lobed segments, margins serrate, petioles with clasping bases; umbels 3-10 cm. diameter, compound in large terminal panicle; calyx minute; petals yellow, inflexed; fruit with mericarps flattened against each other, the margins thin with submarginal nerve apart from 3 central ribs between which the vittae are visible. Of European origin and a familiar root vegetable; naturalised in waste places where garden litter has been left, even at higher elevations such as Bull's Head on Brindabella Range. 'Parsnip'. Fig. 280.

***P. sativa L.**

11. FOENICULUM Mill.

Densely tufted biennial or short-lived perennial with erect stems to 2 metres high; leaves much subdivided into filiform segments, petioles with broad clasping bases which are less well-developed on upper leaves; aromatic, aniseed-scented; compound umbels in terminal corymbose panicle; involucre bracts lacking; petals yellow, incurved; fruit oblong, mericarps with 5 prominent ribs, 2 being adjacent to commissure, 5-6 mm. long. Of European origin, naturalised in waste ground and near old settlements. A cultivated form is used for culinary purposes. 'Fennel'. Fig. 281.

***F. vulgare Mill.**

12. ANETHUM L.

Annual or biennial herb to 1 metre high when mature, stems dichotomously corymbose, striate; broad bases of leaves loosely clasping or becoming recurved; compound above with slender segments which are finally recurved and more or less tangled; compound umbels large, bracts absent; petals yellow, incurved, soon deciduous; fruit broadly oblong, 3.5-4.5 mm. long, dorsally flattened, each mericarp 5-ribbed, broad back 3-ribbed between winged lateral ribs. Native to Europe and Asia, grown as a garden herb but becoming naturalised in the Canberra area (Black Mountain). 'Dill'. Fig. 282.

***A. graveolens L.**

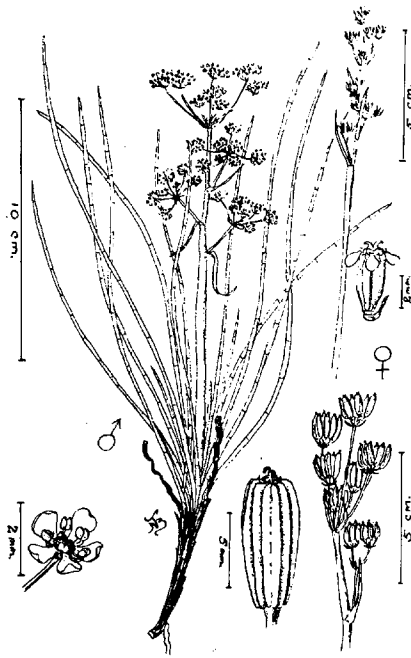
13. APIUM L.

Diffuse annual herb with slender glabrous stems; leaves 2-4 cm. long, subdivided into filiform or very narrow linear segments, bases of petioles broadened and scarious on margins; umbels compound but without common peduncle, appearing to arise in pairs or threes in upper axils or terminal; flowers minute; fruit 1.5-2 mm. long, mericarps with 5 prominent ribs, dark coloured when ripe. Weed of cultivated ground, reputed to taint milk if present in dairy pastures; of American origin but naturalised and sometimes regarded as native in parts of temperate Australia. 'Slender Celery'. Fig. 283.

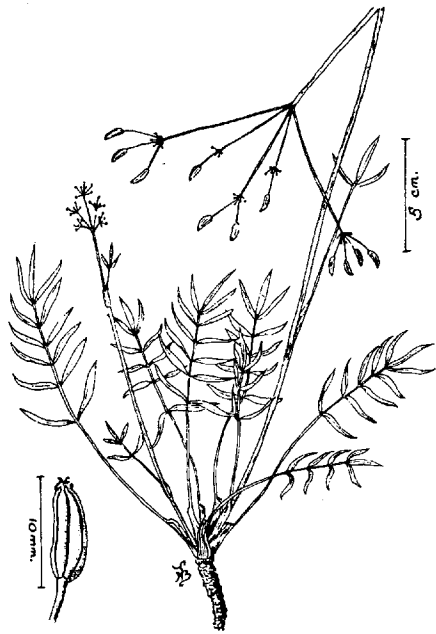
***A. leptophyllum (Pers.) F. Muell.
ex Benth.**

14. ACIPHYLLA J. R. et G. Forst.

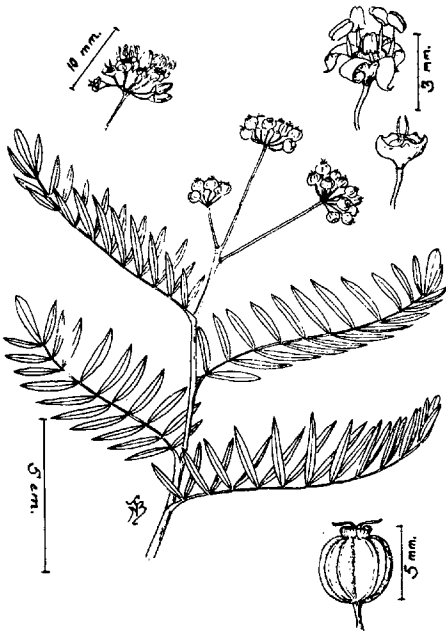
Perennial herb, butt covered by fibres from old leaves; new leaves sub-fleshy, radical, simple, linear-terete, striate and septate when dry, 20-30 cm. long; 1-1.5 mm. diameter; flowers dioecious; male umbels in racemose panicles, umbels and umbellules subtended by acuminate reddish bracts; slender pedicels reddish; flowers reddish or white; female panicles with stouter peduncles, mericarps of fruits linear-oblong with 3-5 ribs which are narrowly winged, not much compressed laterally, 8-10 mm. long. Common in alpine woodland and



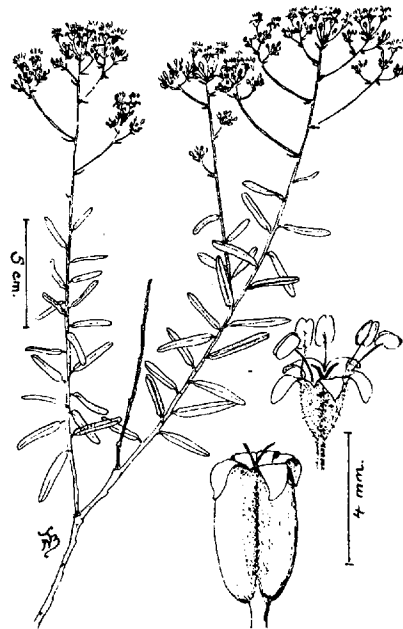
284. *Aciphylla simplicifolia*



285. *Seseli harveyanum*



286. *Tieghemopanax sambucifolius*



287. *Astrotricha ledifolia*

swamps at high elevations; also south-eastern New South Wales and Victorian Alps. Fig. 284.

A. simplicifolia (F. Muell.) Benth.

15. **SESELI** L.

Perennial herb with few radical leaves arising from a deeply placed tuberous rootstock; leaves pinnate, to 18 cm. long, slender with linear-lanceolate segments; umbels compound on long basal peduncles or on stem bearing 1-2 reduced leaves; flowers pedicellate, minute and few successful in setting seed; fruits 8-10 mm. long, narrow-oblong, glabrous. Grows among grasses in alpine woodland or forest habitats; south-eastern New South Wales, north-eastern Victoria. According to Dawson (1961) the two Australian species referred to *Seseli* may prove to belong to *Gingidium* J. R. et G. Forst. Fig. 285.

S. harveyanum F. Muell.

ARALIACEAE

1. Leaves pinnate, glabrous and glaucous (local plants).

1. *Tieghemopanax*

1a. Leaves simple, undersurfaces with stellate tomentum.

2. *Astrotricha*

1. **TIEGHEMOPANAX** R. Viguier

Bushy shrub commonly about 1.5 metres high; leaves imparipinnate, 10-15 cm. long, greyish-green with waxy bloom, leaflets narrow linear-elliptical or narrow oblong, 2-4 cm. long, acute and paler beneath, pairs rather distant along rachis; umbels paniculate in upper axils or terminal to short lateral shoots; flowers small, calyx truncate, petals pale, 2-2½ times as long as ovary, soon deciduous; fruits bluish-white, plump, slightly longer than broad and with rounded ribs. Common above 3500 ft, the local form lacks the bipinnate leaves with elliptical sometimes toothed leaflets which, by their similarity to those of *Sambucus*, gave rise to the specific epithet. Though constant in form locally the species shows much variation over its range; eastern Queensland to Victoria. 'Elderberry Panax'. Fig. 286.

T. sambucifolius (Sieb. ex DC.) R. Viguier

2. **ASTROTRICHA** DC.

Low diffuse shrub less than 1 metre high, stems with dense stellate tomentum, creamy or rusty in colour turning grey or thin on older parts; leaves linear or oblong, 1.5-5 cm. long, obtuse, entire, margins recurved; upper surface green and glossy though sparsely stellate-hairy, lower surface densely tomentose; flowers pedicellate in sub-umbellate corymbs in a terminal panicle sometimes forming nearly ½ height of plants; petals creamy, tomentose on back, often persistent; fruit oblong, 4-5 mm. long, mericarps sparsely tomentose, wrinkled rather than ribbed. In dry forest sites from 2000 to 4000 ft, commonly in colonies of plants; also New South Wales and Victoria. Fig. 287.

A. ledifolia DC.

EPACRIDACEAE

1. Fruit indehiscent or splitting into 1-seeded nutlets.

2. Anthers exerted on long filaments.

1. *Styphelia*

2a. Anthers enclosed in the tube or partially exerted, filaments short.

3. Corolla lobes glabrous or papillose on inner face.

4. Flowers in axillary clusters, spikes or racemes.

5. Tips of corolla lobes without retrorse point on inner face of apex; flowers pedicellate.
2. **Lissanthe**
- 5a. Inner face of corolla hollowed by impressions from anthers and with retrorse point below apex; flowers subsessile.
3. **Monotoca**
- 4a. Flowers axillary, often grouped below leafy shoots.
4. **Brachyloma**
- 3a. Corolla lobes hairy on inside.
6. Corolla lobes densely bearded (except **Leucopogon suaveolens**).
7. Corolla lobes shorter than the tube, anthers enveloped in the hairs of the lobes.
5. **Astroloma**
- 7a. Corolla lobes not much shorter than tube or as long; anthers free from woolly hairs of lobes.
6. **Leucopogon**
- 6a. Corolla lobes not densely bearded. (See also **Leucopogon suaveolens**.)
8. Hair stiff in reflexed tufts at tips of corolla lobes; flowers commonly on the older woody parts of the stems.
7. **Acrotriche**
- 8a. Hairs sparsely arranged on the inner face of the lobes almost glabrous; flowers axillary along leafy branches.
8. **Melichrus**
- 1a. Fruit a loculicidal capsule with several to many seeds in each cell.
9. Leaves narrowed to base or shortly petiolate; corolla tubular, opening normally; flowers axillary or along the branches, sometimes in upper axils.
9. **Epacris**
- 9a. Leaves broad at base and stem clasping; corolla ovoid-conical, remaining closed and at length circumsciss near the base; flowers in clusters in a pedunculate spike-like panicle.

10. **Richea**

1. **STYPHELIA** J. E. Sm.

Shrub to 2 metres high; leaves elliptical to oblanceolate, 1.5-2.5 cm. long, 3-6 mm. broad, acute-acuminate with pungent mucro, paler beneath with the semi-longitudinal nerves fanning out from short petiole which is pubescent on inner face like the branchlets; flowers single or 2-3 in axils towards base of current season's growth; bracts and bracteoles embracing base of calyx, coriaceous, ovate, obtuse or acute and striate; sepals more than twice as long as bracteoles (7-8 mm.), but similar in texture; corolla yellowish-green, tube about 15 mm. long, lobes about 5 mm. long but revolute, hirsute on inner face; anthers exerted on slender filaments longer than lobes; fruit an ovoid drupe slightly longer than persistent sepals. Woodland and dry forest areas especially in eastern parts of the A.C.T.; eastern New South Wales. Fig. 288.

S. triflora Andr.

2. **LISSANTHE** R.Br.

Small shrub to 60 cm. high or more or less procumbent; leaves linear-oblong, 8-15 mm. long, thick, shortly petiolate, acute-acuminate with pungent mucro, smooth and green above, pale beneath with margins, midrib, and intercostal areas prominent (appearing 5-striate); flowers in short axillary racemes towards ends of minutely pubescent branchlets; rhachis of raceme white-papillose pubescent, pedicels subtended by concave ovate bracts ciliate on margins and bearing a pair of bracteoles (ciliate on margins and more or less papillose along keels) below the calyx; sepals similar to bracts and bracteoles, slightly pouched at base, about $\frac{1}{4}$ as long as corolla; corolla white or pinkish, 3-4 mm. long, lobes

shorter than the tube but thick and commonly with a few hairs in orifice where oblong anthers are visible; style about as long as tube, sulcate almost to stigma, with spreading hairs in lower half; ovary densely white-papillose-pubescent; fruit depressed-globose and pubescent, more or less distinctly 10-ribbed, 2.5-3 mm. diameter, style persistent. In woodland and dry forest habitats below 2500 ft; Queensland to Tasmania and South Australia. Fig. 289.

L. strigosa (J. E. Sm.) R.Br.

3. MONOTOCA R.Br.

Small shrub with glabrous foliage; leaves oblong, 6-15 mm. long, 2-4 mm. broad, very shortly petiolate, narrowed obtusely to pungent mucro, green and smoothly convex above, pale beneath with green semi-longitudinal nerves; flowers in small axillary spikes, subtended by minute orbicular-ovate ciliate bracts; bracteoles about twice as long as bracts, keeled, ciliate; sepals ovate-oblong, rounded-obtuse, 1 mm. long, ciliate; corolla white, 2.5-3 mm. long; lobes about as long as tube, papillose on inner face which is hollowed by former position of anther, an inflexed or retrorse point below apex; anthers almost as long as lobes and half-exserted; fruit an oblong drupe twice as long as persistent sepals. Common in dry sclerophyll habitats between 2000 and 3000 ft; Queensland to Tasmania and South Australia. 'Broom Heath'. Fig. 290.

M. scoparia (J. E. Sm.) R.Br.

4. BRACHYLOMA Sond.

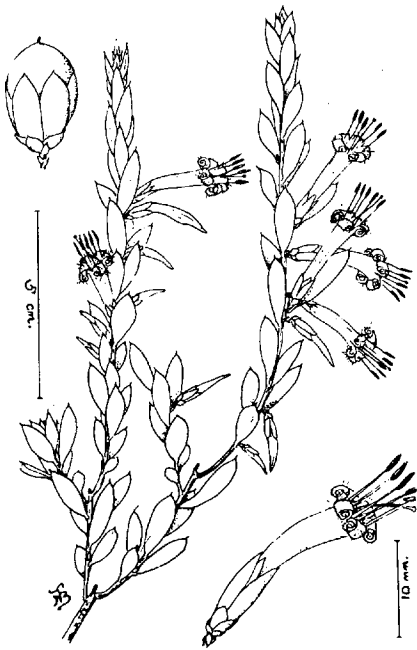
Small shrub to 60 cm. high, branchlets commonly minutely pubescent; leaves 5-10 mm. long, 2-4 mm. broad, oblong to oblanceolate or shortly and broadly obovate, shortly petiolate, obtuse or acute with minute callous apiculum, slightly concave above, pale beneath and striate with nerves radiating from 3 longitudinal central ones, pubescent or subglabrous and ciliate (local plants): flowers axillary towards base of current season's growth, lower ones subtended by bracts which may approach leaf size, upper ones in leaf axils; bracts soon deciduous, bracteoles close under calyx and similar to but shorter than lanceolate ciliate sepals 1.5 mm. long; corolla creamy white, cylindrical or flask-shaped tube 3.5-4.5 mm. long with short reflexed hairs inside the throat, lobes acuminate to 2 mm. long, inner face papillose in lower half; anthers visible in orifice; style short, persistent; fruit depressed globose. Common in woodland and dry forest habitats on slopes near Canberra, Black Mountain, Mt Ainslie etc.; Queensland, New South Wales, Victoria, and South Australia. Fig. 291.

B. daphnoides (J. E. Sm.) Benth.

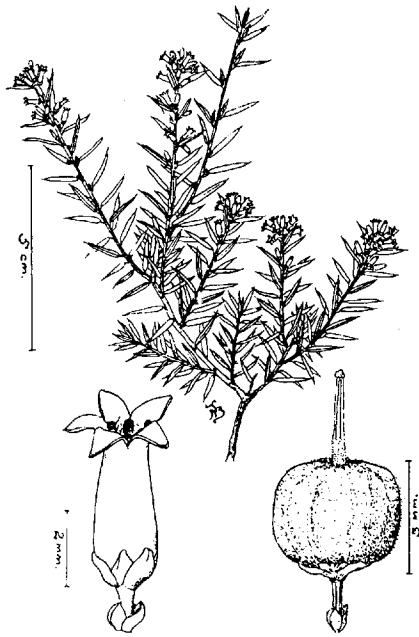
5. ASTROLOMA R.Br.

Prostrate undershrub forming small mats; branchlets minutely pubescent; leaves narrow elliptical to oblanceolate, concave below, 7-11 mm. long, 1-2 mm. broad, sessile, acuminate above with 1 mm. long mucro, pale and striate beneath, margins distantly ciliate-toothed with short bulbous-based hairs; flowers solitary in leaf axils or on leafless older stems, commonly few per plant, bracts and bracteoles broadly ovate, mucronate and less than $\frac{1}{2}$ as long as sepals; sepals oblong or ovate-oblong, mucronate, striate, 5-6 mm. long; corolla bright red, tube 8-10 mm. long with a ring of hairs inside below the middle, lobes acuminate-mucronate, about 3 mm. long, bearded on inner face; anthers about $\frac{1}{2}$ as long as lobes, filaments flattened and attached near top of tube; style slender, about as long as tube; fruit an oblong to globose drupe. In dry habitats in woodland or forest at lower elevations, especially on shallow soils; occurs throughout temperate districts in all States. The drupe is edible. 'Cranberry Heath'. Fig. 292.

A. humifusum (Cav.) R.Br.



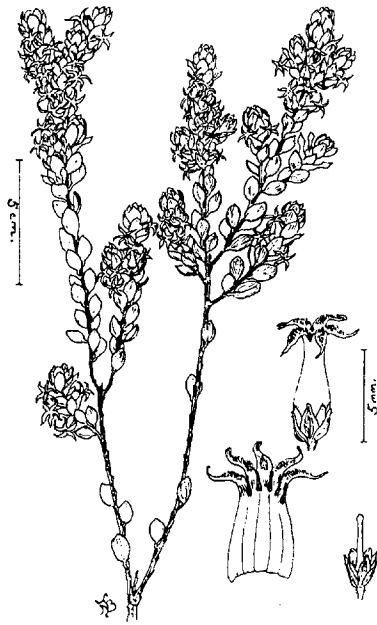
288. *Styphelia triflora*



289. *Lissanthe strigosa*



290. *Monotoca scoparia*



291. *Brachyloma daphnoides*

6. LEUCOPOGON R.Br.

1. Flowers axillary, single with rudimentary bud attached at the base or paired; anthers without pale sterile tips; leaves less than 10 mm. long and with pungent mucro.

2. Style longer than corolla tube; buds acuminate; corolla lobes with tangled hairs (when dry) and a subulate apex; fruit oblong; sepals lanceolate, acuminate or acute.

3. *Prostrate and more or less rhizomatous*, or with long decumbent branches; *leaves elliptical to narrowly oblanceolate*, 6-10 mm. long (including 1-1.5 mm. mucro), *flat or almost so*, narrowed gradually to short petiole, glabrous except for thin scarios margins which are spinulose-ciliate towards acute-acuminate apex; *flowers erect*, usually solitary; bracts reniform, mucronate, ciliate, bracteoles similar but twice as large (1-1.25 mm. long); sepals 3 mm. long, broadly lanceolate or oblong-lanceolate, the ciliate margins much incurved (when dry) and appearing acuminate, apex minutely apiculate; corolla tube 4.5-5 mm. long, lobes 3-3.5 mm. long, hairs on inner face much crumpled and extending into mouth of tube; style exerted, villous or hirsute in lower half. Adjacent to granite outcrops in southern parts of the A.C.T.; New South Wales, Victoria, and Tasmania.

1. *L. stuartii* F. Muell. ex Sond.

3a. *Erect, diffuse or low growing but not prostrate*, $\frac{1}{2}$ -1 metre high, branchlets minutely pubescent to shortly hispid; *leaves oblong-lanceolate, obtuse at base and broader than stem*, 4-6 mm. long (with 1 mm. mucro), 1-1.5 mm. broad, margins recurved and also scabrid-spinulose in upper half, finely striate beneath, apex acute or acuminate (see also notes below); *flowers reflexed, pendulous from spreading branches single or paired*; bracts, bracteoles and sepals ciliate but glabrous on back (except in Black Mountain form); bracts broadly ovate, mucronate, 1 mm. long, bracteoles similar but larger; sepals 3.5 mm. long, lanceolate, acuminate, margins later inrolled; corolla tube 4-4.5 mm. long, lobes acuminate, hairs thinner towards base and not extending into tube; style exerted about length of lobes, glabrous; fruit 5-celled. Common species of dry forest habitats throughout the A.C.T. In a Black Mountain form the leaves are scabrid-hispid on both surfaces, margins hispid, bracts, bracteoles, and sepals scabrid pubescent on back in upper third. Fig. 293.

2. *L. aff. fletcheri* Maiden

2a. Undershrub less than 1 metre high; *leaves oval to oblong* with midrib excurrent in mucro and prominent below it, 2-5 mm. long (mucro 0.25-0.75 mm.), margins slightly to much recurved, apex obtuse below mucro; flowers erect, axillary, forming leafy spikes or appearing clustered on short axillary branchlets; *buds obtuse*, bracts and bracteoles broadly orbicular-ovate, ciliate, the latter almost 1 mm. long; sepals ovate, obtuse, 2 mm. long, margins ciliate with an apical hair tuft; *corolla tube shorter than sepals*, lobes 2 mm. long, *densely covered with copious straight hairs which are longer towards the short blunt apex*; *style not exerted*; fruit 5-celled. There are two local forms. In one the leaves are scabrid above, papillose-scabrid between the nerves of the striate undersurface, bracts and bracteoles scabrid or scabrid-pubescent, sepals sparsely hairy in upper half. It has been collected at Pine Island on the Murrumbidgee River and along Mountain Creek Road near Fairlight and may possibly represent *L. mucronatus* DC. In the other form the leaves are hirsute or hispid above the underlying scabridity, the nerves of the undersurface obscured, bracts, bracteoles and sepals hirsute. It occurs around Tuggeranong and near Canberra and may represent *L. ramulosus* A. Cunn. ex DC. In a broad sense the species is distributed on the Tablelands of New South Wales and in eastern Victoria.

3. *L. attenuatus* A. Cunn. sens. lat.

1a. Flowers in clusters, spikes, or racemes which are terminal or in the upper axils; leaves not mucronate though sometimes with a callous apex.

4. Corolla lobes with copious hairs (commonly tangled) which extend to the minute narrow tip; anthers with pale sterile tips; fruit green or yellowish.

5. Erect shrub, 1-2 metres high, young branchlets minutely puberulous; *leaves 12-30 mm. long, 3-6 mm. broad, elliptical to oblanceolate, acute or obtuse* with callous apiculum, margin entire below, scabrid towards apex, flat or slightly recurved, glabrous, stiff but thin, paler and finely striate beneath; *racemes reflexed*, often terminating short lateral branchlets, *rhachis glabrous*; striate bracts ovate, obtuse, about 2 mm. long, ciliate, bracteoles similar, not much longer but with distinct keel; sepals 2.5-3 mm. long, ovate-lanceolate with thick minutely hooded apex; corolla tube as long as or slightly longer than sepals; lobes 1.5 mm. long (when tube is long) or 2.5 mm. (when tube is short); fruit 2-celled. In wet sclerophyll forest in gullies of the ranges; also New South Wales and Victoria.

4. **L. gelidus** (F. Muell. ex Benth.)
N. A. Wakefield

5a. Leaves mostly less than 10 mm. long (4-18 mm.) but if more than narrow lanceolate-acuminate; flowers in clusters or short spikes; rhachis papillose-pubescent.

6. *Straggling shrub to 1 metre high*, branchlets hirsute (local variety); leaves 2.5-4.5 mm. long, 1-1.5 mm. broad; narrow lanceolate to narrow oblong, margins recurved, *obtuse with recurved apiculum*; (in local plants scabrid-papillöse as well as stiffly hispid especially on upper surface and on margins); flower clusters partly hidden by subtending leaves which have short petioles; bracts 1.5 mm. long, bracteoles 2 mm. long, both ovate acuminate (densely hispid and ciliate in local plants); sepals lanceolate with narrow incurved-subulate apices, 3 mm. long; corolla about as long as sepals, the narrow lobes about 2 mm. long (i.e. about twice as long as tube), copiously white-hairy, hairs tangled when dry. The species is distributed from Queensland to Victoria.

5. **L. microphyllus** R.Br. var.
pilibundus (A. Cunn. ex DC.)
Benth.

6a. *Low spreading or decumbent shrub*, branchlets pubescent when young, stems wiry with leaves sometimes distant on non-flowering branches; *leaves narrow lanceolate, acuminate with erect callous apex*, from 3 mm. long on flowering branchlets to 18 mm. on longer ones, glabrous on both surfaces or scabrid-hispid on both, striate beneath with midrib prominent towards summit or nerves partly obscured by vestiture, petiolate; flowers in short spikes, terminal or in upper axils; bracts broadly ovate, obtuse, slightly incurved at apex, striate or obscurely so, about 1 mm. long, ciliate; bracteoles similar but slightly longer with stronger keel which may be scabrid or scabrid-hispid in hairy forms; sepals oblong lanceolate, 2-2.5 mm. long, obtuse and keeled towards apex, ciliate, glabrous or scabrid-hispid; corolla tube shorter than sepals, lobes about 2 mm. long with the copious hairs long and straight towards the apex. A common species of woodland and dry forest habitats; New South Wales to Tasmania and South Australia. 'Common Beard-heath'.

6. **L. virgatus** (Labill.) R.Br.

4a. *Low procumbent, sometimes rhizomatous undershrub*, branchlets minutely pubescent; *leaves petiolate, oblong, obtuse*, 4-6 mm. long, 1-1.5 mm. broad, flat or slightly concave below, smooth or scabrid above, striate and glabrous beneath or (in hairy forms) papillose-scabrid especially between the nerves, margins slightly recurved but on lower leaves of each shoot commonly developing pale scarious margins, entire or minutely scabrid-ciliate towards apex; flowers in short spikes at or near ends of branches; bracts orbicular-ovate, less than 1 mm. long, ciliate; bracteoles similar but with stronger keel which may be scabrid; sepals unequal, lower oval, upper oblong, incurved, ciliate, keeled, about twice as long as bracteoles; corolla tube about 1½-2 times as long as sepals, lobes thick, 1.5 mm. long, the hairs not copious and reduced to mere papillae in upper third; fruit a *red globose berry*.

Common at high elevations in alpine woodland and heathy places; New South Wales, Victoria, some forms tropical.

7. *L. suaveolens* J. D. Hook.

Note: This species is represented locally by the form described as *L. hookeri* Sond. based on *L. obtusatus* J. D. Hook. non Sond. Sleumer (1963) considered this could not be separated from *L. suaveolens*, a prior name based on a plant from Borneo. Sleumer refers all *Leucopogon* spp. to *Styphelia* but this extreme view is not followed here. He also referred *Lissanthe montana* R.Br. = *Leucopogon montanus* (R.Br.) J. H. Willis to *L. suaveolens*. It differs in the papillose corolla lobes and white berry and in the flowering period according to Willis (1956b). This occurs in the Kosciusko area but has not been found in the A.C.T.

7. ACROTRICHE R.Br. See Paterson (1960)

1. *Prostrate* perennial shrub, branches pubescent. *Leaves linear-lanceolate*, acuminate 5-7.5 mm. long (including slender mucro 1-1.5 mm. long), smooth above or with few scattered hairs, 3-5-striate beneath (3 nerves plus margin), minutely papillose especially in grooves, entire or sparsely ciliate, shortly petiolate; flowers in short *spikes developed on older leafless parts of the stems*; bracts broadly ovate, 0.75 mm. long, bracteoles broadly ovate and keeled, 1 mm. long; sepals ovate-oblong, 2 mm. long, minutely pubescent; corolla greenish, tube 2.5-3 mm. long, slightly inflated, orifice closed by short hairs from minute cushions and also from staminal filaments, lobes oblong-lanceolate, 1.5-2 mm. long with conspicuous hair tuft a little below acute apex; anthers reflexed between lobes; style short; ovary papillose in upper half; fruit a depressed globose berry, 4-4.5 mm. diameter, scabrid-papillose above. In dry forest habitats; also New South Wales to Tasmania and South Australia. 'Ground-berry'. Fig. 294.

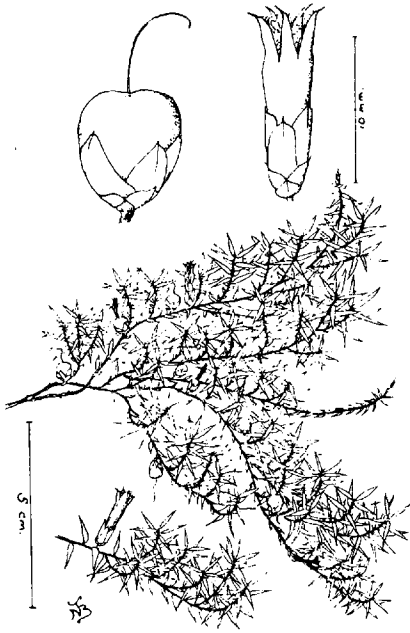
1. *A. serrulata* (Labill.) R.Br.

1a. *Scrambling shrub to 1 metre high*, young branchlets pubescent but soon glabrescent; *leaves lanceolate to oblong-lanceolate*, 8-13 mm. long (with mucro 1 mm.), smooth above, minutely papillose beneath and striate with smooth branched nerves; *flowers in short spikes axillary to leaves below recent growth*; bracts and bracteoles less than 1 mm. long, the latter keeled; sepals ovate-oblong, deeply concave, margins irregularly scarioso-ciliate, 1.5 mm. long; corolla greenish, tube as long as or slightly longer than sepals; throat closed with hairs as in above species, lobes about 1 mm. long, the tuft of hairs conspicuous but not dense and apex acute; style short, ovary glabrous; fleshy fruit globose, the hard endocarp 2.5 mm. diameter (when dry). Recorded for summit of Mt Tidbinbilla; also eastern New South Wales.

2. *A. divaricata* R.Br.

8. MELICHRUS R.Br. See Paterson (1957)

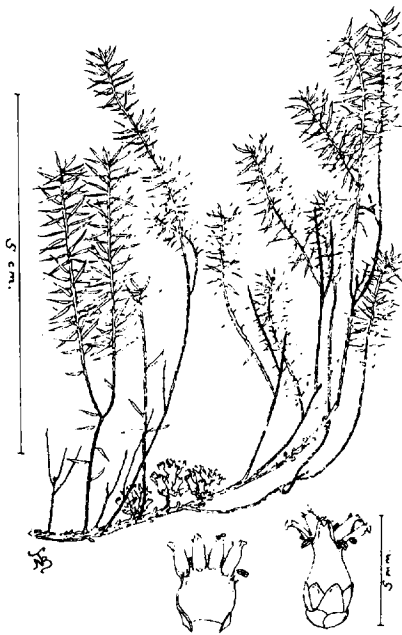
Undershrub of bushy or ascendent habit; branchlets pubescent; leaves subsessile, lanceolate, acuminate, 10-20 mm., 3-4 mm. wide at base, smooth and minutely scabrid above, deeply striate with parallel nerves and pale beneath, margins scabrid; flowers axillary, the short pedicels covered by imbricate bracts grading into oblong-obovate bracteoles about 2.5-3 mm. long, all ciliate; sepals chartaceous like bracts, ovate, ciliate; corolla creamy or greenish, tube little shorter than sepals, with scales alternating with filaments in throat; lobes 3-3.5 mm. long with few hairs on inner face, apiculate; fruit a globose greeny berry shorter than persistent sepals. Common in dry sclerophyll habitats at low elevations; Queensland to Victoria. The A.C.T. material can be separated into two distinct forms. In one (see Fig. 295A) the plants are low and ascendent, flowers 7-8 mm. long, sepals obtuse, glabrous though ciliate, petals obtuse to acute. This form is common on Black Mountain. In the second the plants are bushy to 30 cm. high, flowers 9-10 mm. long, bracts and sepals



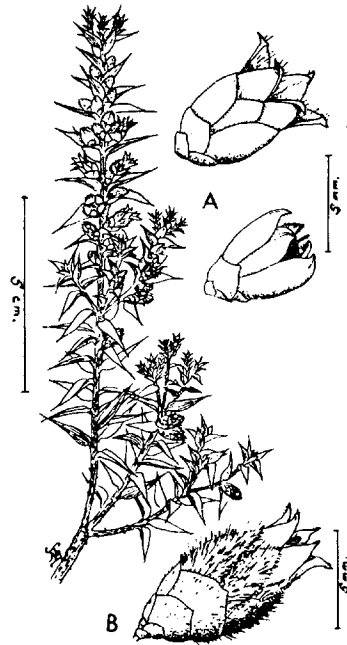
292. *Astroloma humifusum*



293. *Leucopogon* sp.



294. *Acrotriche serrulata*



295. *Melichrus urceolatus*

hairy and acute, petals acuminate and long apiculate, the inner hairs placed low on lobes (see Fig. 295B (flower)). This form is common along the Sutton road and in the Molonglo Gorge-Queanbeyan area. It could be referred to *M. medius* A. Cunn. if regarded as distinct at the species level.

M. urceolatus R.Br.

9. EPACRIS Cav.

1. Corolla tube as long as or longer than sepals; style fusiform and more than 5 mm. long, at least as long as tube or exerted.

2. Low shrub or up to 1 metre high, wholly glabrous or the young branchlets minutely pubescent, soon glabrescent; *leaves narrow lanceolate to elliptical, acuminate with pungent mucro*, 5-7 mm. long, midrib prominent beneath, sessile; flowers in upper axils, often clustered in leafy heads at ends of branchlets; bracts ovate grading into ovate-lanceolate or oblong-lanceolate, slightly keeled towards apex, minutely and obscurely ciliate; sepals similar to bracts, acute or obtuse, keeled towards summit, 4.4-5 mm. long; *corolla milky white*, drying brownish, tube longer than sepals (5.5-5 mm.) and about 1 mm. in diameter, lobes ovate-cordate, obtuse, about 3 mm. long, margin incurved when dry; anthers in orifice with stigma slightly higher. In heathy places near swamps at high elevations especially above 4500 ft; New South Wales to Tasmania.

1. E. paludosa R.Br.

2a. Shrub to 1 metre high, branchlets minutely pubescent; *leaves oval to obovate, obtuse*, 3-6 mm. long, thick, smooth above, paler beneath with thick margins also midrib prominent in upper half and one pair of lateral nerves more or less evident, *glabrous or pubescent on the short petiole and scabrid along the margins*; flowers in upper axils or clustered in leafy heads at ends of branchlets; bracts grading from broadly ovate to ovate-oblong, obtuse, more or less keeled; glabrous but ciliate on margins; *corolla creamy drying yellowish*, tube 6-7 mm. long, 2.5-3 mm. in diameter; lobes ovate-cordate, obtuse, 2.5-3 mm. long; anthers in orifice, *style exerted and almost as long as lobes*. In the A.C.T. this is known only from Mt Coronet.

2. E. robusta Benth.

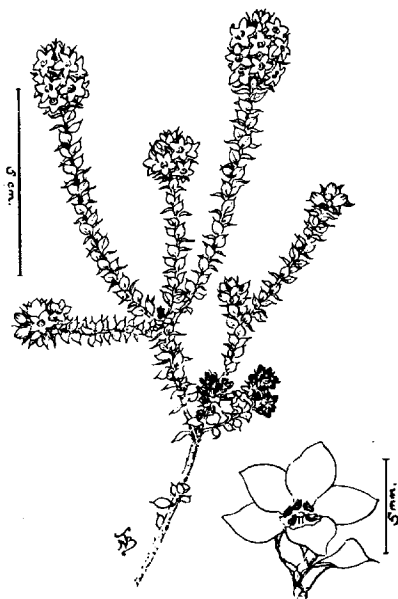
1a. Corolla tube very short and shorter than sepals; style less than 1.5 mm. long; leaves mucronate, commonly pungent-pointed.

3. Shrub to 1 metre high, slender branches erect, pubescent; *leaves broadly ovate and often cordate at base*, 2-5 mm. long, acute below mucro, upper surface smooth, lower obscurely wrinkled, glabrous, margin minutely scabrid and narrowly translucent, petiole minute; leaves often curved around stem, distant or loosely imbricate; *flowers axillary along branches thus forming leafy spikes, shorter than subtending leaves*; bracts graduated in size, ovate, ciliate; sepals ovate-lanceolate, acute 2-2.5 mm. long, pink-red up the centre, margins thin; corolla white, tube 1.5-2 mm. long, funnel-shaped, lobes slightly longer than tube, ovate, obtuse; style less than 1 mm. long. In swampy habitats in cold mountain valleys and at high elevations; Queensland to Tasmania and South Australia. 'Coral Heath'.

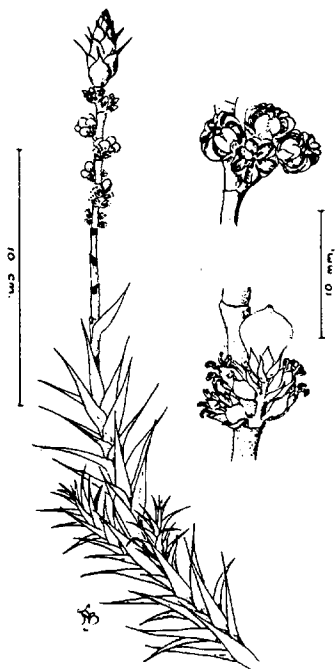
3. E. microphylla R.Br.

3a. Flowers axillary in upper axils and commonly forming headlike clusters, leaves with thick margins.

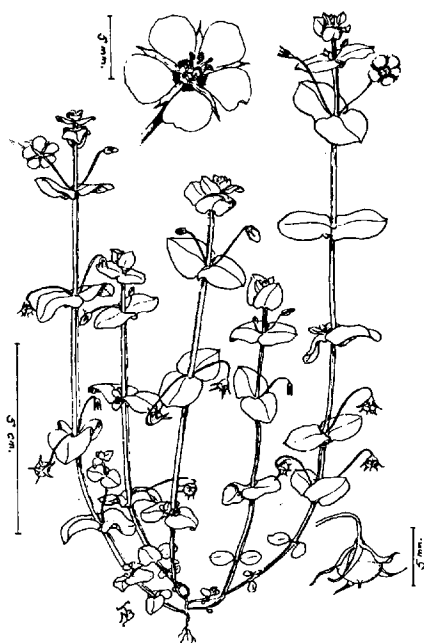
4. Shrub to 2 metres high, branchlets pubescent; *leaves broadly ovate to ovate-elliptical*, 5-10 mm. long with pungent mucro above acute or acuminate apex, spreading or recurved, minutely scabrid above, paler and scabridulous beneath with margins and midrib prominent; bracts ovate, *acuminate*, ciliate, mucronate, midrib prominent; sepals similar to bracts, 3.5-4 mm. long; corolla white, tube 2.5-3 mm. long, broadly funnel shaped, lobes ovate to oval, obtuse, rather thick; anthers in orifice; style about 1 mm. long. Common along creeks



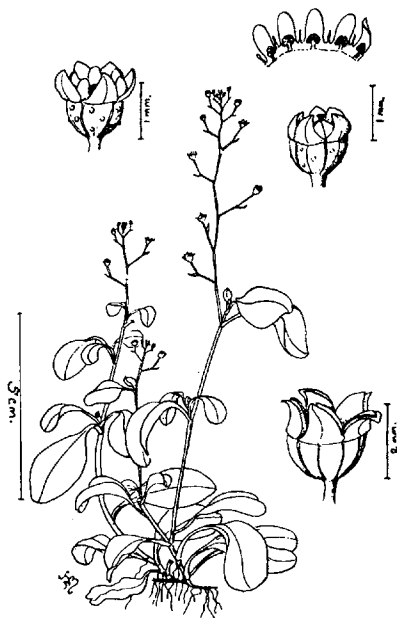
296. *Epacris breviflora*



297. *Richea continentis*



298. *Anagallis arvensis*



299. *Samolus valerandi*

and in swamps of forested mountain gullies, also at high elevations. Local plants differ from the original description in having corolla lobes as long as tube, bracts and sepals mucronate and scabrid leaves (under lens). 'Drumstick Heath'. Fig. 296.

4. *E. breviflora* Stapf

4a. Shrub less than 1 metre high; leaves 2-4 mm. long, thick, broadly elliptical-obovate, scabrid pubescent on upper face, glabrous and paler beneath with midrib and margins prominent (dry); bracts and sepals similar to those of above but smaller and acute; sepals about 2.5 mm. long; corolla white, tube less than 2 mm. long, lobes about 2 mm. long, ovate, obtuse; style less than 0.5 mm. long. In vicinity of sphagnum swamps on Snowy Flats, Mt Gingera.

5. *E. petrophila* J. D. Hook.

10. *RICHEA* R.Br.

Shrub to 1 metre high; leaves linear-acuminate, sessile, imbricate and stem clasping, concealing the stem, 2-3.5 cm. long, erect or spreading above, rigid, pungent-pointed but not mucronate, glossy above, paler beneath and striate; flowers in small clusters at nodes of spicate panicle, erect above leafy portion of branches; rhachis marked by rings at nodes, each flower cluster at first covered by a broad brown ovate bract with rigid acuminate apex which is pungent and may be hooked; flowers subtended by bracts and bracteoles; calyx 2 mm. long, sepals ovate; corolla creamy, ovoid, slightly longer than sepals, lobes not separating and later circumsciss near base; anthers on slender filaments; style short and thick; capsule a little longer than calyx, persistent style in a depression. Common in and on margins of swamps at high elevations; south-eastern New South Wales and north-eastern Victoria. Fig. 297.

R. continentis B. L. Burt

PRIMULACEAE

1. Annual, leaves opposite, flowers orange or blue, axillary.

1. *Anagallis*

1a. Herbaceous perennial, leaves alternate or all in basal cluster; flowers white or pinkish, in terminal racemes.

2. *Samolus*

1. *ANAGALLIS* L. See Kollman and Feinbrun (1968)

Annual herb, stems erect and quadrangular; leaves sessile, ovate to oblong-lanceolate, obtuse 7-20 mm. long, glabrous; flowers on slender pedicels which finally become longer than leaves and are reflexed in fruiting stage; calyx divided almost to base into narrow acuminate lobes with pale margins, 3.5-4 mm. long but somewhat enlarged in fruit; corolla slightly longer than calyx, deeply lobed, lobes dark at base; stamens 5, filaments ciliate, attached to base of corolla opposite the petals; capsule globular, circumsciss. A garden weed naturalised in temperate regions of the world including Australia. The common local form has orange-red petals, this being more widespread in colder districts than the blue-flowered form; however a single collection of a blue-flowered form has been made in the Black Mountain area and may represent an escape of experimental material from CSIRO glasshouses. 'Scarlet Pimpernel'. Fig. 298.

A. arvensis L. subsp. *arvensis*

2. *SAMOLUS* L.

Small glabrous perennial herb with leaves in a basal rosette or alternate up the angular stems, basal rosette sometimes withered or apparently absent; leaves broadly obovate or spatulate, narrowed at base, apex rounded or obtuse; 1.5-3.5 cm. long; flowers in terminal racemes, on slender pedicels with minute bracts below the middle; calyx cupular-campanulate,

attached to half-inferior ovary, about 1 mm. long in flower, 2 mm. in fruit, lobes triangular and shorter than tube; corolla twice as long as calyx lobes; stamens short, alternating with staminodia; capsule globose, splitting to base, crowned by persistent lobes. Cosmopolitan species, found in wet or swampy habitats; in the A.C.T. has been collected in Molonglo Gorge and on Paddy's River. 'Brookweed'. Fig. 299.

S. valerandi L.

GENTIANACEAE

1. Corolla campanulate, white with dark veins.

1. *Gentianella*

1a. Corolla tubular with spreading pink or yellow lobes.

2. Calyx shortly lobed, quadrangular; ovary 1-celled; corolla yellow.

2. *Cicendia*

2a. Calyx deeply lobed.

3. Corolla yellow; anthers not becoming twisted; stigma notched.

3. *Sebaea*

3a. Corolla pink; anthers becoming spirally twisted after dehiscence; stigma 2-lobed.

4. *Centaurium*

1. *GENTIANELLA* Mcench

Herb with reddish or purple quadrangular stems, ascendent or erect above basal leaf tuft; radical leaves oblanceolate to elliptical, 2.5-7 cm. long, narrowed below into a slender base, commonly 3-nerved; stem leaves opposite, 1-5 cm. long, 2-5 mm. wide, lacking slender base of radical ones; flowers in terminal cymose corymb; calyx deeply 5-lobed, 7-11 mm. long, lobes linear-lanceolate, acuminate, 1-nerved; corolla white with purple veins, 14-18 mm. long, deeply lobed and campanulate, lobes oblong obtuse; anthers purple, filaments flattened; ovary 1-celled, 2-lobed stigma sessile; calyx and corolla persistent around elongating capsule; seeds subglobular, about 1 mm. diameter, brown, minutely wrinkled. In grassy places in subalpine and alpine habitats, flowering late summer (February-March). Apparently perennial under local conditions, the plants are dark hued and inconspicuous until the corollas expand. Also south-eastern New South Wales, south-east of South Australia, Victoria, and Tasmania. 'Native Gentian'. Fig. 300.

G. diemensis (Griseb.) J. H. Willis

2. *CICENDIA* Adans.

Small annual herb, often less than 5 cm. high, stems simple or branched near base, quadrangular, glabrous; leaves opposite, ovate-elliptical, acute, 3-7 mm. long; flowers solitary, terminal on slender peduncle longer than lower internodes; calyx quadrangular with angles passing into short acute lobes with smaller lobes between; corolla yellow, lobes obtuse; anthers short, in mouth of tube; ovary 1-celled, seeds minute, reticulate. In wet swampy habitats at low elevations—vicinity of Canberra, Kowen area, Queanbeyan etc. Native to California now naturalised in New South Wales, Victoria, and South Australia. Easily overlooked owing to small size. Fig. 301.

**C. quadrangularis* (Lam.) Griseb.

3. *SEBAEA* Sol. ex R.Br.

Glabrous annual herb 15-25 cm. high, internodes much longer than leaves and quadrangular below the nodes, stems simple or branched above; leaves broadly ovate to elliptical, obtuse or acute, 5-12 mm. long; flowers in forked cymes; calyx deeply 5-lobed, 4 mm. long, lobes lanceolate acuminate but angular with prominent nerves; corolla yellow, tube about as long as calyx; anthers in throat, not twisted after flowering; ovary 2-celled, top of style thickened in slightly notched stigma; seeds minute, marked with minute ribbing. Herb of

moist grassy habitats in woodland sites, flowering in early summer; throughout temperate Australia, Tasmania, and New Zealand. Fig. 302.

S. ovata (Labill.) R.Br.

4. CENTAURIUM Hill

1. Glabrous annual herb with *basal rosette of leaves* which may have withered and fallen in the flowering stage but whose presence is shown by the *basal series of very short internodes*; basal leaves oblong to broadly oblanceolate, obtuse, 3-5-nerved, 3-5 cm. long; internodes much longer than stem leaves, angular below decurrent leaf margins; stem leaves oblong, lanceolate or oblanceolate, obtuse or acute, 3-nerved, sessile and slightly clasping at base, margins often recurved, 1.5-4 cm. long; flowers subsessile, *clustered at ends of numerous axillary paired branches* arising from upper or from most axils; calyx 4-5 mm. long, tube shorter than lobes and scarious, lobes with prominent green midrib and up to $\frac{1}{2}$ as long as corolla tube in flower; corolla tube 8-10 mm. long, scarious and striate, slightly constricted below throat, pale; lobes spreading, deep pink, 4-5 mm. long, obtuse; stamens in throat; style branched above with 2 papillose stigmas; capsule fusiform, filling tube of persistent corolla; seeds minute, reticulate. Native to Europe but widely naturalised in temperate regions including Australia, summer-flowering; in the A.C.T. grows in woodland and open forest sites. Nomenclature of this species is confused, here we accept the name used in current English works. 'Pink Stars', 'Centauray'. Fig. 303.

1. **C. erythraea* Rafn.

1a. Glabrous annual herb, similar to preceding but *lacking basal rosette of leaves or a series of short internodes* though 1 or 2 short ones may be present; stems with 5-9 internodes below inflorescence; lowest leaves obovate to oblong, 1.5-2.5 cm. long, obtuse; stem leaves narrower, acute or shortly acuminate, often slightly longer than basal ones; *inflorescence open* with erect branches, formed of a subsessile flower between slender axillary branches terminating in another subsessile flower between a further pair of branchlets in axils of leafy bracts, in lower series the axillary branches up to $2\frac{1}{2}$ times as long as centrally placed flower; flowers similar to those of preceding but calyx usually at least $\frac{1}{2}$ and commonly more than $\frac{1}{2}$ as long as corolla tube in flower; corolla lobes 3-4 mm. long; capsule loosely filling persistent corolla tube. A species of western Europe and the Mediterranean not easily distinguished from preceding but a useful character is that the corolla dries purplish whereas in *C. erythraea* it dries rose-pink. Common name as for preceding. In similar habitats but more often in shaded places.

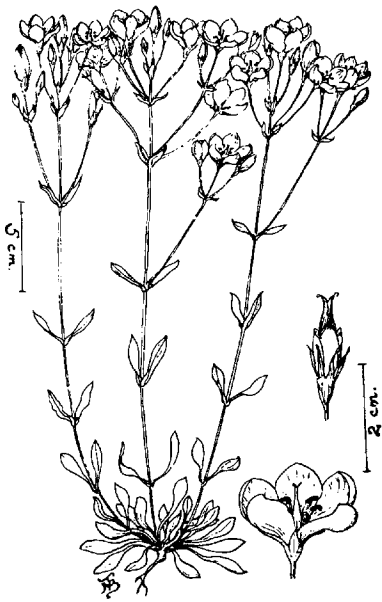
2. **C. tenuiflorum* (Hoffm. et Link) Fritsch

MENYANTHACEAE

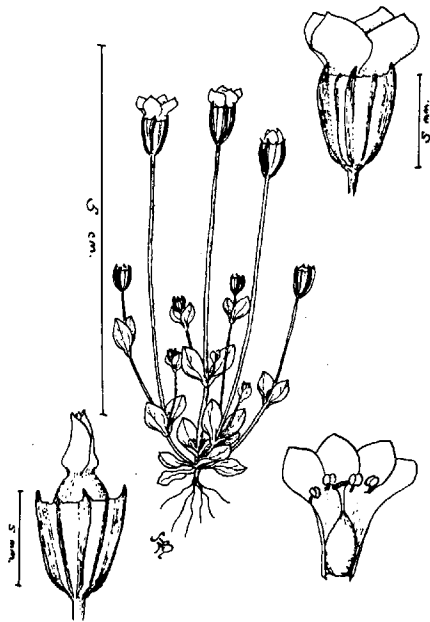
NYMPHOIDES Seguiet

Plants rooted in mud with leaves on long petioles so that blades float on or protrude above surface of water; blades broadly ovate-orbicular or reniform, sinus narrow, veins obscure, margin entire or irregularly sinuate; calyx deeply 5-lobed, lobes oblong, obtuse; corolla 2-3 times as long as calyx, golden-yellow, deeply fringed on margins and with fringed appendage at base of spreading lobes; style long or short, stigmas fringed. Not common in the A.C.T.; pool at source of Gibraltar Creek, also in Paddy's River. The flowers open in morning sunlight but wither by early afternoon; widespread throughout eastern and southern Australia. 'Fringed Water-lily', 'Floating Heart'. Fig. 304.

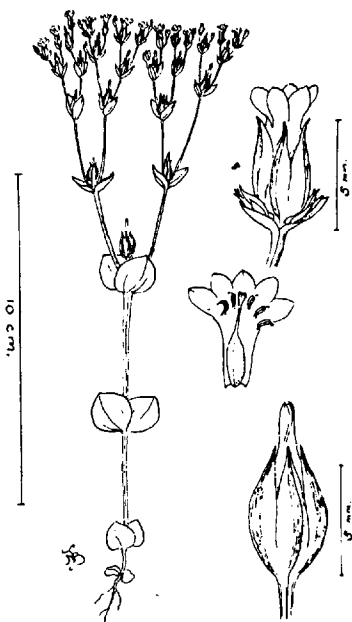
N. geminata (R.Br.) Kuntze



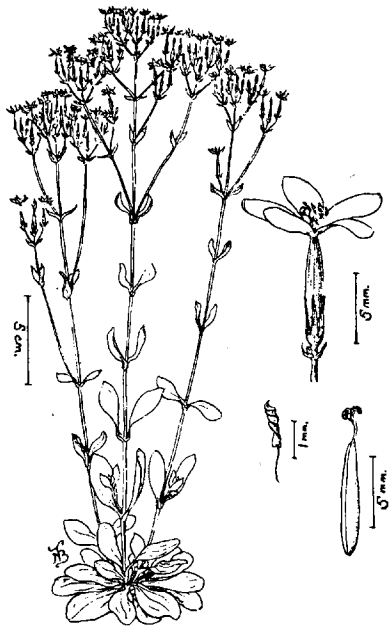
300. *Gentianella diemensis*



301. *Cicendia quadrangularis*



302. *Sebaea ovata*



303. *Centaurium erythraea*

CONVOLVULACEAE

1. Plants trailing or with twining branches; corolla pink or white, more than 1 cm. long.

1. *Convolvulus*

1a. Plants stoloniferous; corolla white or yellow, less than 1 cm. long in minute flowers.

2. *Dichondra*

Note: *Wilsonia rotundifolia* W. J. Hook. a small prostrate perennial with leaves 3-6 mm. long and small yellowish flowers has been recorded from muddy banks of Lake George. Not known from the A.C.T. but may appear near Lake Burley Griffin.

1. CONVOLVULUS L.

1. Perennial herb, stems trailing or loosely twining, *hairy-pubescent on all parts*, leaves petiolate, *blade divided into narrow lobes with central lobe longest, or narrow linear with 1-2 pairs of spreading lobes at base* or upper leaves almost entire; flowers axillary, peduncle slender with narrow bracteoles above the middle; calyx 4-6 mm. long, *outer sepals more pubescent than inner*; corolla usually pink, sometimes very pale, funnel-shaped, 1.5 cm. long, lobes shallow; calyx slightly enlarged around dry capsule containing 4 rough seeds. Common in natural pastures, often persistent in gardens; widespread in many parts of Australia and Tasmania. 'Australian Bindweed'. Fig. 305.

1. *C. erubescens* Sims

1a. Perennial herb with creeping rootstock and rhizomes, *shoots glabrous or sparsely pubescent except when very young; leaves hastate or sagittate or entire*; flowers axillary, peduncle bracteolate as in preceding; *calyx glabrous* but minutely ciliate; corolla pink or white, 1.75-2 cm. long, margin with shallow lobes; capsule as in preceding but *seeds almost smooth*. A troublesome weed in cultivated areas such as orchards and market gardens but uncommon in the A.C.T., e.g. Duntroon area near lake margin; naturalised in many parts of temperate Australia and Tasmania but of European origin. 'Bindweed'.

2. **C. arvensis* L.

2. DICHONDRA J. R. et G. Forst.

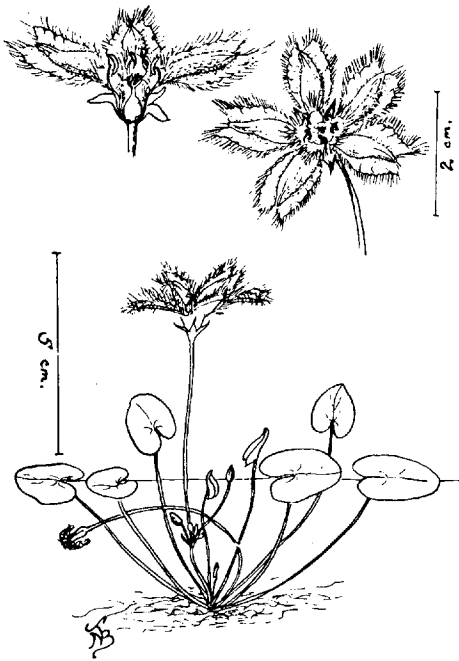
Perennial stoloniferous or rhizomatous herb, petiolate leaves arising singly from underground stems; leaves and petioles minutely hirsute, blades kidney-shaped or orbicular with rounded lobes at base, digitately veined, 1-3 cm. long; flowers inconspicuous on axillary peduncles shorter than petioles and without bracteoles; corolla white or pale yellow, only slightly longer than minute sepals; capsule 1- or 2-celled, each cell with a single seed. Very common in forested habitats and damp places in mountain gullies; widespread in many warm countries including Australia, Tasmania, and New Zealand. (A selected form is sometimes used in lawns.) 'Kidney Weed'. Fig. 306.

D. repens J. R. et G. Forst.

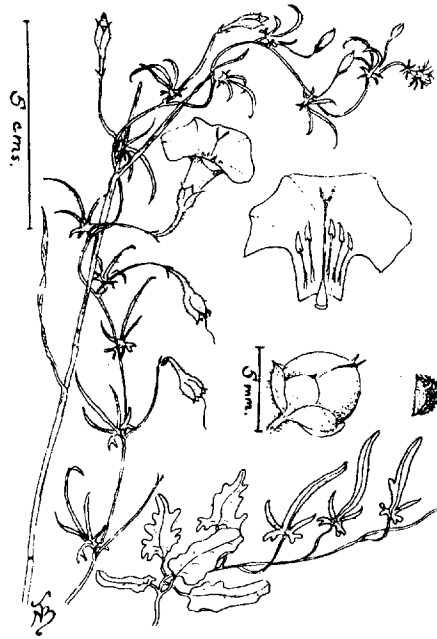
POLEMONIACEAE

NAVARRETIA Ruiz et Pavon

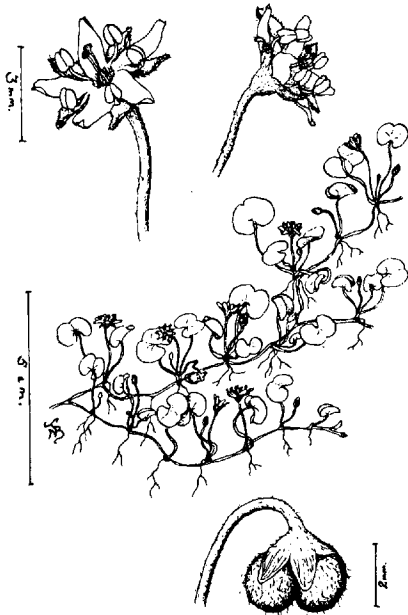
Annual herb clothed with sticky glandular hairs; leaves pinnatisect the narrow lobes with pungent apices; flowers in dense heads surrounded by leafy bracts; calyx with rigid spiny lobes joined by a pale membrane in the lower half; corolla blue, as long as or shorter than the calyx; capsule 3-celled; seeds numerous, dark brown, minutely but irregularly pitted. Of North American origin, naturalised in New South Wales, Victoria, and possibly South Australia; in the A.C.T. it occurs in sandy areas along the banks of the Molonglo



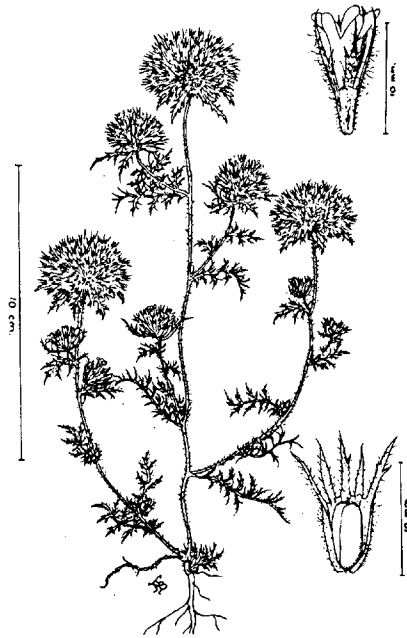
304. *Nymphoides geminata*



305. *Convolvulus erubescens*



306. *Dichondra repens*



307. *Navarretia squarrosa*

and Murrumbidgee rivers and near other permanent streams. 'Californian Stinkweed'. Fig. 307.

**N. squarrosa* (Eschsch.) W. J.
Hook. et Arn.

BORAGINACEAE

1. Anthers on very short filaments and enclosed in corolla tube.
2. Style short below a stigmatic cone, ovary not deeply lobed.
 1. **Heliotropium**
- 2a. Style slender, stigma minute or capitate or lobed, ovary deeply lobed around base of style.
3. Fruitlets obliquely attached to a conical receptacle.
4. Plants clothed with stiff bristly hairs.
 5. Corolla yellow, tube straight; nutlets not deeply hollowed at base.
 2. **Amsinckia**
 - 5a. Corolla blue, tube curved, nutlets deeply hollowed within basal areole.
 3. **Lycopsis**
- 4a. Plants scabrid, corolla white or pale blue.
 4. **Cynoglossum**
- 3a. Fruitlets basally attached to flat or almost flat receptacle.
6. Flowers subtended by leafy bracts, fruitlets with rough surface.
 5. **Lithospermum**
- 6a. Flowers without leafy bracts, fruitlets smooth.
 6. **Myosotis**
- 1a. Anthers on slender filaments, 2 or all exerted from corolla tube; corolla reddish-purple or deep blue or drying blue; plants with rough bristly hairs.
 7. **Echium**

1. HELIOTROPIUM L.

Decumbent or erect scabrid-hirsute annual; leaves ovate to oblong, 1.5-5 cm. long, obtuse, scabrid with tubercle-based hairs especially on undersurface, petioles slender, sometimes as long as blades; flowers crowded in scorpioid cymes, rhachis and calyces hirsute with stiff hairs (as on younger parts), calyx about 2 mm. long, deeply lobed, persistent; corolla white, tube as long as calyx, limb with 5 spreading obtuse lobes; stigmatic cone more or less persistent on young fruit which later splits into 4 rugose-tuberculate nutlets. Probably of Mediterranean origin, widespread in New South Wales (especially in vicinity of Murray drainage system), Victoria, and South Australia. Collected from Canberra area and Murrumbidgee River west of Hall, adjacent to the A.C.T. Growth may be abundant on bare or fallow areas after summer rains and likely to cause stock poisoning. 'Common Heliotrope', 'Caterpillar Weed' (from similarity of hairy cymes to furry caterpillars).

**H. europaeum* L.

2. AMSINCKIA Lehm.

1. Annual, erect or ascendent to 60 cm. high, *clothed with coarse bristles without or (on young parts of inflorescences) with some strigose hairs*; leaves sessile, broadly lanceolate to linear, 4-20 cm. long, 0.6-4 cm. wide, obtuse to acuminate; flowers in scorpioid cymes much elongated later; calyx of 5 linear-lanceolate sepals, 3-4 mm. long (to 10 mm. in fruit); corolla yellow, *tube slightly longer than sepals, throat open and glabrous*, limb spreading; anthers attached about middle or higher; nutlets rugose or muricate on outer face, triangular-ovoid, narrowed to apex, 2.2-5 mm. long. Australian material of this difficult American genus has been referred to either *A. hispida* (Ruiz et Pavon) Johnston, a South American species, or to *A. intermedia* Lehm. ex Fisch. et Mey. which is common in the western U.S.A.

Our material agrees more closely with descriptions of the latter in current American Floras. Not a common weed in the A.C.T. but found in vicinity of Canberra. 'Yellow Burr-weed'.

1. **A. intermedia* Lehm. ex Fisch.
et Mey.

1a. Similar to preceding but *shorter finer hairs admixed with bristles except on oldest parts of stems*; sepals 5-6 mm. long (to 10 mm. in fruit), linear-lanceolate; *corolla tube 2-3 mm. longer than sepals*; *throat constricted by saccate hairy outgrowths*; nutlets 2.4-3 mm. long, similar to those of preceding species. Of American origin, occasional weed in the A.C.T.

2. **A. lycopsoides* Lehm.

3. LYCOPSIS L.

Erect annual or biennial herb, to 40 cm. high, clothed with long spreading bristly hairs from tuberculate bases: lowest leaves broader, narrowed to petiole, stem leaves sessile, 5-15 cm. long, linear to lanceolate or oblanceolate, margins undulate and distantly toothed, upper leaves stem clasping; cymes terminal, capitate-scorpioid, simple or branched, bracts ovate, flowers subsessile; calyx deeply lobed, lobes lanceolate, with conspicuous bristles on outer face and margins, slightly enlarged in fruit; corolla tube longer than calyx, curved or sharply bent, limb spreading to 5-6 mm. diameter and bright blue, scales present in throat; nutlets tuberculate-wrinkled with ridged apex, broad oblique basal areole deeply hollowed. Native to Europe and Asia, recorded for New South Wales, Victoria, and South Australia, and has been collected at Uriarra Crossing and at Kambah Pool on the Murrumbidgee River, in the A.C.T. Owing to differing opinions concerning generic limits some authorities place this species in *Anchusa*. 'Wild Bugloss'.

**L. arvensis* L.

4. CYNOGLOSSUM L.

1. Herbaceous perennial to 30 cm. high, scabrid with rough tubercle-based hairs; leaves mostly basal, elliptical or lanceolate, 5-12 cm. long, narrowed below, midrib prominent on undersurface, margin often undulate, inflorescence often forming most of the height of the plants; flowers in paniculate cymes, *with scattered bracts* of which the lowest are leafy and upper minute; flowers pedicellate, pedicels longer than flowers and lengthening below fruit; calyx deeply lobed, 2-3 mm. long, scabrid; corolla white, tube as long as calyx, orbicular lobes spreading; fruit of 4 *subglobose nutlets* covered with short spinose bristles with retrorsely scabrid tips. Widespread in grassland and woodland areas; Queensland to Tasmania and South Australia. 'Sweet Hound's Tongue'. Fig. 308.

1. *C. suaveolens* R.Br.

1a. Scabrid perennial herb to 1 metre high, stems more leafy than in preceding; leaves in radical cluster and alternate along stem but *not present in bractless inflorescence*, linear-lanceolate or elliptical, often narrowed into slender base but upper ones sessile; flowers in paniculate cymes and soon distant; pedicels longer than or about as long as calyx; calyx 2 mm. long; corolla light blue and (with lobes) about twice as long as calyx; fruit of 4 *nutlets with an oblique flattened outer face covered with bristles and with marginal ridge of denser bristles* which also cover back except on area of attachment. In similar habitats to preceding but more common at higher elevations in the mountains, especially in shady or cool damp places; widespread throughout temperate Australia (Western Australia, Queensland, and Tasmania). 'Australian Forget-me-not'.

2. *C. australe* R.Br.

5. LITHOSPERMUM L.

Annual herb, scabrid with loosely appressed hairs, stems simple or branched from base; leaves oblong or oblanceolate, 1.5-3.5 cm. long, 3-10 mm. wide, midrib prominent below; flowers in cymose racemes towards ends of branches subtended by leafy bracts longer than

the calyces, pedicels very short; calyx obtuse at base, deeply lobed, lobes linear-lanceolate, unequal, to 3 mm. long in flower, lengthening to 10 mm. in fruit, coarsely hairy but less so in fruiting stage and with prominent midrib; corolla hairy outside, tube slender, slightly longer than calyx, lobes short and obtuse, throat closed with short hairs; anthers low in tube; fruit of 4 pale warted basally attached nutlets. Common weed of waste ground and cultivated areas; of European origin but naturalised throughout temperate Australia though rarely common. 'Corn Gromwell'. (The local species was referred to *Buglossoides* Moench by Johnston (1954) but this is considered a synonym of *Lithospermum* by botanists in countries to which it is native.) Fig. 309.

**L. arvense* L.

6. *MYOSOTIS* L. See Schuster (1967)

1. Calyx hairs spreading, some at least having hooked apices.
2. Herb with erect simple or branched ascendent stems clothed with loose or spreading stiff hairs, usually annual or short-lived perennial; leaves oblong to narrow oblanceolate, 1.5-5 cm. long, 2-5 mm. wide, obtuse; inflorescence coiled when young but soon elongating, rhachis with loosely appressed and *also some spreading hairs*; calyces with numerous stiff hooked hairs on tube and at least some on lobes, about 2-2.5 mm. long in flowers, 5 mm. in fruit, lobes broadly triangular, about as long as the tube which is broadly campanulate but not or scarcely angular at base in fruit; corolla white or bluish, tube slightly longer than calyx; nutlets smooth and shining. Widespread in southern and temperate Australia and Tasmania; a herb of woodland and open forest habitats over a wide altitudinal range. 'Southern Forget-me-not'.

1. *M. australis* R.Br.

- 2a. Annual, similar to above but the hairs of the rhachis all appressed; calyx with fewer hooked hairs on tube and none on the hirsute lobes, lobes narrower than in preceding but up to twice as long as tube in fruit, tube angled at base by prominent nerves. Of European origin, naturalised in New South Wales, Victoria, and Tasmania; found in disturbed areas or near settlements in the A.C.T. Fig. 310.

2. **M. discolor* Pers.

- 1a. Herb with ascendent branches, rooted at lower leafless nodes (possibly short-lived perennial), appressed hairs short on vegetative parts; leaves oblong-elliptical to oblanceolate, narrowed below, 2-8 cm. long, obtuse; panicle forming upper half of plants, of cymose racemes coiled at apices; pedicels to twice as long as calyces in fruit; calyx about 2 mm. long *strigose with appressed hairs*, lobed to middle, lobes triangular, acute, about twice as long as broad in fruit though shorter than tube; corolla pale blue, tube as long as calyx, lobes spreading to 4 mm. diameter; nutlets shining, turning black. Of European origin but now widely naturalised in backwaters and shallow channels of creeks and rivers in the A.C.T. Australian distribution uncertain due to confusion with *M. scorpioides* L., a name regarded by Schuster (1967) as being confused and not applicable with any accuracy.

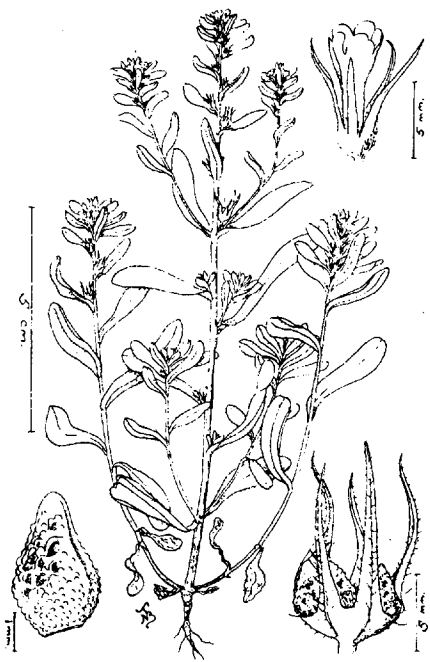
3. **M. caespitosa* K. F. Schultz

7. *ECHIUM* L.

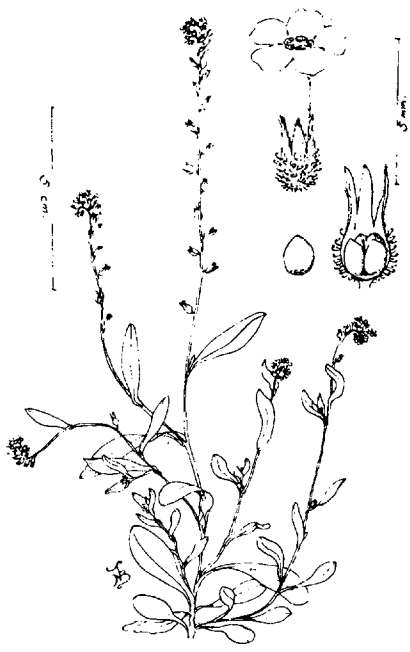
1. Coarse annual or biennial herb with basal rosette of leaves when young; *vestiture of coarse tubercle-based bristles above short pubescence*; leaves oblong to oblanceolate, upper stem leaves with narrow bases and grading into narrow bracts on inflorescence; flowers at first crowded in terminal and short axillary cymes, bracts longer than calyces; calyx deeply lobed, 5 mm. long but up to 10 mm. in fruit; lobes linear to narrow linear-lanceolate, vestiture as for stems; corolla pale blue turning bright blue, 1.5-2 cm. long, all stamens exerted, style hairy; nutlets ovoid with narrow apex, warted on outer face. Of European



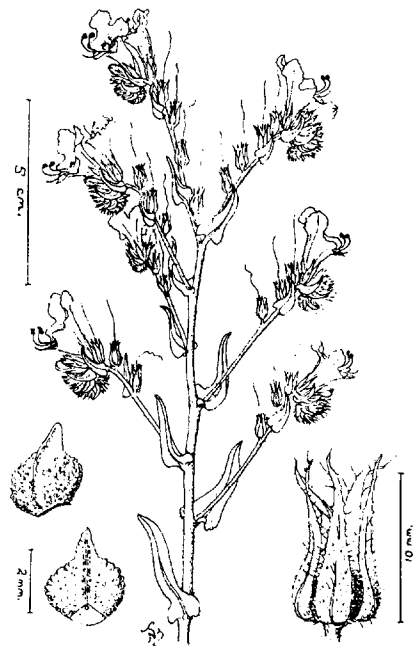
308. *Cynoglossum suaveolens*



309. *Lithospermum arvense*



310. *Myosotis discolor*



311. *Echium lycopsis*

origin but now naturalised in New South Wales, Victoria, and South Australia; not common in the A.C.T. but growing on waste ground, roadsides or along river channels. 'Viper's Bugloss'.

1. *E. vulgare L.

1a. Coarse annual or biennial similar to preceding; *vestiture of tubercle-based bristles only*; lower leaves to 20 cm. or more long; *upper cauline leaves with broad cordate loosely stem-clasping bases* and grading into the narrow but cordate-based bracts of the inflorescence which is paniculate with the cymose branches bare at base; calyx deeply lobed, 8-10 mm. long in flower, not much enlarged in fruit, with tubercle-based bristles on margins and midrib of lanceolate-acuminate lobes; corolla purplish blue drying bright blue but red towards base when fresh; 2-3 cm. long; 2 *anthers exerted on long slender filaments*, others in throat of tube; style hairy; nutlets similar to those of above. Reputed to have been introduced as a garden plant; widely naturalised in temperate Australia where, as a weed of crops, it is known as 'Paterson's Curse' though in arid districts it is called 'Salvation Jane'. Fig. 311.

2. *E. lycopsis L.

VERBENACEAE

VERBENA L.

Robust herb to 2 metres high, stems quadrangular, rigid, scabrid; leaves opposite, lanceolate to elliptical, 4-8 cm. long, 10-25 mm. wide, acute to acuminate, sessile with clasping base, margins serrate; panicle large with flowers in cylindrical spikes terminating ultimate branchlets; bracts lanceolate, slightly longer than calyces, both coloured purplish and scabrid-hairy; calyx 5-ribbed with short narrow lobes, 2 mm. long; later swollen around fruit; corolla dark bluish-purple, slender tube about twice as long as calyx, lobes spreading, stamens and style enclosed; seeds oblong with brown outer face obscurely ribbed, angled inner face with raised white spots. Of South American origin but naturalised in New South Wales, Victoria, and South Australia; a roadside weed in the A.C.T. where it flowers in summer. 'Purple-top'. Fig. 312.

*V. bonariensis L.

LABIATAE (LAMIACEAE)

1. Teeth of the calyx almost equal in size.
2. Corolla almost equally 4-lobed, not divided into differently shaped upper and lower lips.
3. Aromatic herbs; leaves entire, crenate or shortly toothed, less than 6 cm. long; stamens 4.

1. **Mentha**

- 3a. Not strongly aromatic; leaves sharply toothed, more than 6 cm. long; stamens 2.

2. **Lycopus**

- 2a. Corolla divided into upper and lower lips of differing size and shape or appearing 1-lipped.
4. Herbs with opposite leaves; stamens 4.
5. Stamens protruding above the very short upper lip of the blue corolla; leaves narrowing into petiole-like bases.

3. **Ajuga**

- 5a. Stamens not protruding; upper lip not very short.
6. Calyx with 10 subulate hooked teeth; corolla white, upper lip with 2 erect lobes; leaves coarsely and deeply wrinkled.

4. **Marrubium**

6a. Calyx 5-lobed; corolla purplish, upper lip hooded over stamens; leafy bracts sessile and embracing the flower clusters.

5. **Lamium**

4a. Shrubs with whorled leaves; stamens 2; corolla pale violet spotted within.

6. **Westringia**

1a. Calyx distinctly 2-lipped, lobes unequal in size and shape.

7. Herbs.

8. Lower lip of calyx almost truncate; upper lip pouched; flowers solitary in upper axils, stamens 2.

7. **Scutellaria**

8a. Lower lip of calyx with 2 lanceolate teeth.

9. Stamens 2; flowers in false whorls in terminal racemose panicles.

8. **Salvia**

9a. Stamens 4; flowers in dense cylindrical spikes and partially hidden by broad ovate bracts.

9. **Prunella**

7a. Shrubs; lower lip of calyx entire or slightly emarginate.

10. **Prostanthera**

1. **MENTHA L.**

Note: The taxonomy of this genus is confused. The native species need critical revision and the introduced ones are often of hybrid origin following centuries of use as culinary herbs.

1. Flower clusters axillary along leafy stems or, when dense, the clusters distant and without leaves but the stems often continued as leafy shoots after flowering.

2. Calyx lobes hairy within but not closing the throat of the tube; plants not hirsute on all parts.

3. Calyx tube shortly pubescent or hirsute with multicellular hairs of varying diameter above pubescence of short simple and minute glandular hairs; calyx lobes copiously hairy within with fine white hairs.

4. Stems erect or ascendent, scabrid on angles; *leaves 2-5 cm. long*, lanceolate to ovate, *pinnately veined, margins serrate* (subentire when undersized), petiolate, sparsely hairy above; paler beneath with conspicuous oil glands and with multicellular hairs on the nerves; clusters of 6-8 pedicellate flowers in the upper axils, pedicels pubescent (often retrorsely so); bracts narrow, hairy-pubescent; calyx 3.5-4 mm. long, tube striate, slender-obovoid, *hirsute with spreading multicellular hairs or these scattered and not obscuring sparse pubescence underneath*; lobes shorter than tube, the bases villous within, the upper parts slender-subulate and *commonly with a few long hairs at the apices*; corolla lilac to pink, about twice as long as calyx, lobes sparsely hairy outside, stamens exerted. Widespread in New South Wales and Victoria; a common species in mountain gullies in the A.C.T., usually in shady places near water. 'Forest Mint'.

1. **M. laxiflora Benth.**

4a. Leaves less than 2 cm. long, obscurely veined, lateral veinlets few or obscure, margins entire or almost so; calyces shortly pubescent or with few longer hairs.

5. Slender herb with few or loosely tufted *stems clothed with down-curved multicellular hairs* (also on nerves of undersurfaces of leaves, bracts and calyces as in preceding); leaves with slender petioles to 4 mm. long, oblong-lanceolate to ovate, 1-1.75 cm. long, 4-8 mm. wide, obtuse, margins subentire, oil glands numerous on undersurfaces; flowers rarely more than 3 to each axil (= 6 per node); calyx 3 mm. long, tube with short pubescence and few to numerous longer hairs, densely villous on inner face of *triangular lobes which lack*

slender subulate apices; corolla pale pink or lilac (drying pale) less than twice as long as calyx, lobes sparsely hairy outside, stamens exserted. More or less intermediate between *M. laxiflora* and *M. diemenica*. Often of weak habit, found near Canberra and also in mountain gullies. Fig. 313.

2. *M. aff. diemenica*

5a. Slender erect herb or stems numerous from underground rhizomes and forming mats to 1 metre diameter; *stems, leaves, and calyces with short dense pubescence which is retrorse on stems; leaves oblong to oblong-lanceolate*, subsessile or shortly petiolate, 0.8-2 cm. long, 2-6 mm. wide, margin entire or subentire, slightly recurved, oil glands sparse above, numerous beneath; flowers 3 per cluster (6 per node); calyx 3-3.5 mm. long, lobes shorter than tube, triangular with short tips; corolla bright pink (*drying red or deep pink*), tube barely as long as calyx, sparsely hairy outside; stamens exserted. Damp sites in dry sclerophyll habitats; Black Mountain, Fitz's Hill, Gudgenby etc.; widespread in south-eastern Australia and Tasmania but distribution dependent on definition accepted. 'Wild Mint'.

3. *M. diemenica* Spreng.

3a. Slender herb; quadrangular stems glabrous or minutely scabrid on pale prominent angles or minutely pubescent especially on younger parts; leaves narrow or broadly lanceolate, 2.5 cm. long, 4-15 mm. wide, subentire or entire, petiolate; upper surface minutely and obscurely pubescent, lower pubescent especially on prominent but not numerous nerves; clusters of 6-8 flowers (= 12-16 per node); *the narrow linear bracts, pedicels, calyces (including inner faces of lobes) scabrid-hirsute with spreading hairs all approximately the same diameter*, without short pubescence beneath; calyx 4-5 mm. long, lobes about $\frac{1}{2}$ as long as tube and slender-subulate, apices without terminal hair clusters; *corolla white*, tube scarcely as long as calyx; lobes sparsely hairy outside; stamens exserted. Uncommon in the A.C.T., has been collected near Murrumbidgee River at Kambah Pool and in Naas Valley; widespread in eastern and southern Australia and Tasmania and commonly with numerous flowers (to 12 per cluster). 'Australian Mint'.

4. *M. australis* R.Br.

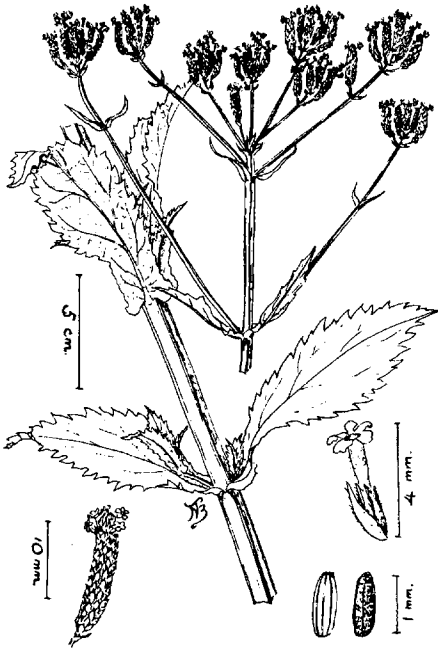
2a. Highly aromatic herb with prostrate, erect or ascendent *hirsute stems*; leaves petiolate, oblong or oval, 0.5-2 cm. long, 5-10 mm. wide, *hairy on both faces* or (like the oil glands) hairs more numerous on undersurface, pinnately veined, subentire or subcrenate; *flower clusters dense*, pedicels at least $\frac{1}{2}$ as long as calyx, hirsute; calyx hirsute, 2.5-3.5 mm. long, lower lobes narrower than upper but all with slender subulate apices, *throat closed by inflexed hairs, lobes not villous within*; corolla lilac-pink, hairy outside. Culinary herb of European origin, naturalised in some settled areas of southern Australia and Tasmania; not common in the A.C.T. 'Pennyroyal'.

5. **M. pulegium* L.

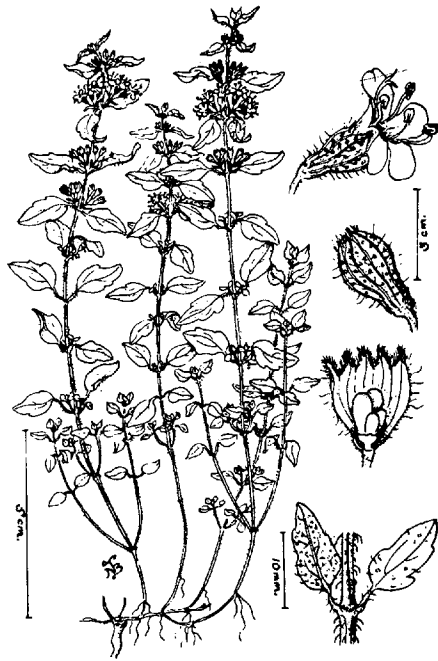
1a. Flowers in false whorls in terminal spikes or clusters: calyx glabrous within. Naturalised species.

6. Erect perennial aromatic herb; *leaves sessile, lanceolate or oblong lanceolate, acuminate, pinnately veined*, 3-8 cm. long, 1-3 cm. wide, margins sharply serrate; flowers in terminal cylindrical spikes, *the false whorls sometimes slightly distant from one another especially towards base*, calyx glabrous or the lobes ciliate; corolla pale lilac, glabrous, tube slightly longer than calyx. A widely grown culinary herb now naturalised in damp sites in and near Canberra. Long used as a culinary herb and its origin uncertain but regarded by some as resulting from a hybrid between *M. longifolia* (L.) Huds. and *M. rotundifolia* (L.) Huds. 'Spearmint'.

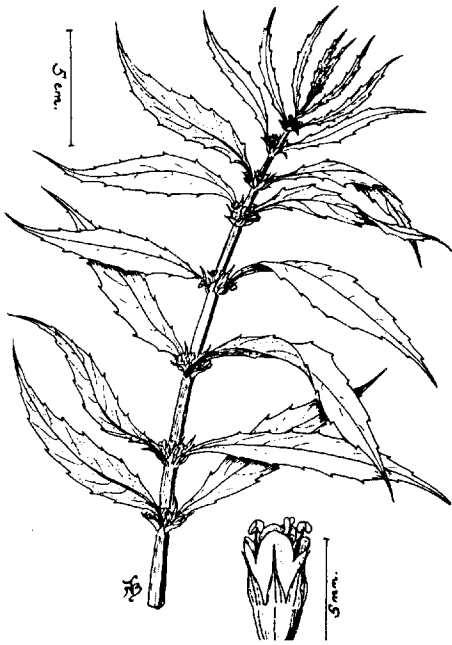
6. **M. spicata* L.



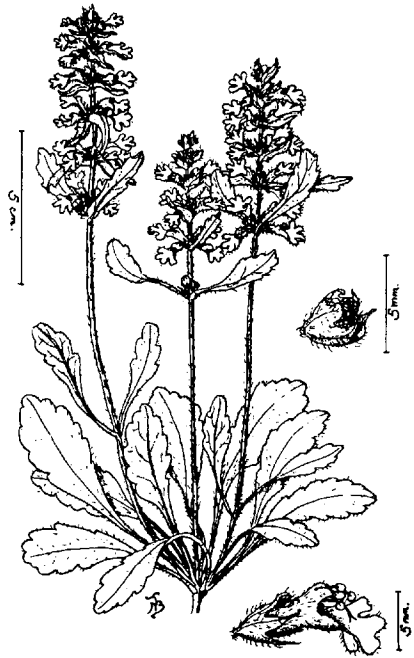
312. *Verbena bonariensis*



313. *Mentha* sp.



314. *Lycopus australis*



315. *Ajuga australis*

6a. Similar to above in habit but the stems coarser and sparsely hairy; leaves subsessile, oblong-ovate to oblong-lanceolate, variably cordate at base, 3-8 cm. long, 2-3.5 cm. wide, serrate, obtuse or rounded at apex, venation reticulate and deeply incised giving rugose appearance to upper surface; flowers in dense terminal spikes in which lowest whorl may be distant; calyx almost glabrous or lobes ciliate, corolla lilac or lilac-pink. A garden herb more winter-hardy than *M. spicata*, naturalised in drains and other damp sites in and near Canberra. On young vegetative shoots the leaves may be shortly petiolate. Probably a representative of a hybrid complex but the local plants seems closest to *M. cordifolia* Opiz (*M. rotundifolia* × *M. spicata*).

7. **M. rotundifolia* (L.) Huds.
sens. lat.

2. LYCOPUS L. See Henderson (1962)

Erect perennial herb to 1 metre high; stems angular, nodes hairy; leaves lanceolate to elliptical, sharply serrate, acuminate, 8-12 cm. long, 15-30 mm. wide, narrowed at base to very short petiole or subsessile, oil glands numerous and nerves prominent on under-surface; flowers small in short axillary clusters, subtended by narrow lanceolate bracts 5-7 mm. long; calyx 3-4 cm. long, lobes similar to bracts and as long as or longer than tube; corolla white, tube shorter than calyx; stamens 2, barely or shortly exerted. Shaded places in lower mountain gullies in the A.C.T.; also Queensland to Tasmania and South Australia. 'Water Horehound'. Fig. 314.

L. australis R.Br.

3. AJUGA L.

1. Erect or ascendent villous herb, stems and undersurfaces of leaves often purplish; radical leaves broadly lanceolate to oblanceolate, 5-12 cm. long, margins crenate, apex obtuse, narrowed to slender petiole; stem leaves similar but sessile, grading to leafy bracts at base of terminal spicate panicles with flowers in false whorls; calyx 4-6 mm. long, villous, divided to middle, lobes lanceolate acuminate but later inrolled-subulate; corolla deep blue or purplish-blue, tube $1\frac{1}{2}$ times as long as calyx, upper lip short and exposing stamens and bifid style, lower lip 3-4 times as long with broad notched central lobe; nutlets wrinkled, glabrous. Common herb of dry forest habitats, flowering in mid or late summer; Queensland to Tasmania and South Australia. 'Australian Bugle'. Fig. 315.

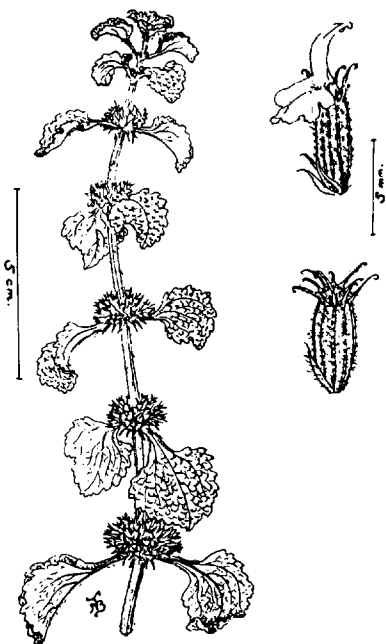
1. *A. australis* R.Br.

1a. Smaller in all parts than above, glabrous or almost so; radical leaves spatulate, stem leaves oblanceolate, margins slightly crenate or subentire; floral leaves all longer than small flower clusters; calyx 3-4 mm. long, subglabrous with broad ciliate lobes shorter than tube which soon becomes campanulate; corolla pale purplish-blue, upper lip less than twice as long and lower lip $2\frac{1}{2}$ times as long as whole calyx, sparsely hairy outside. The plants have a prostrate habit and grow in or near margins of sphagnum swamps. Probably an extreme form of *A. australis* which shows great variation in form over its range.

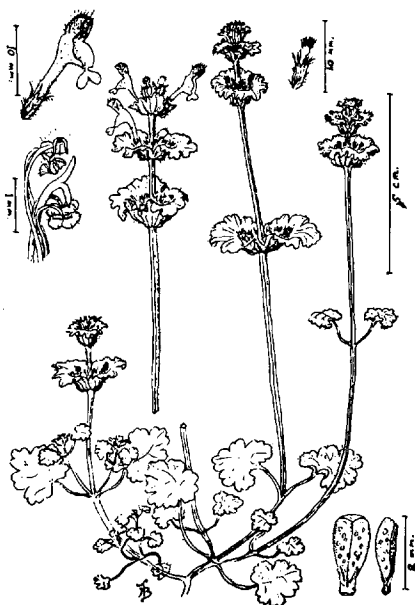
2. *A. sp.*

4. MARRUBIUM L.

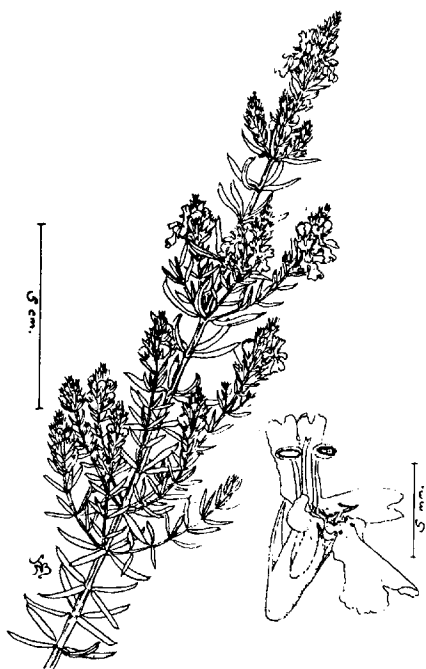
Tufted perennial herb with woolly tomentose stems; leaves broadly ovate to orbicular, 2-3 cm. long, crenate, wrinkled-rugose with deeply incised reticulate veins on upper surface; slender petioles at least $\frac{1}{2}$ as long as blades; false whorls of flowers dense in upper axils; calyx 3-4 mm. long, tomentose with stellate hairs, the 10 subulate teeth each with glabrous hooked apex, tube hairy at orifice; corolla white, tube about as long as calyx, upper lip 2-lobed, lower with broad central lobes, stamens and style enclosed, stamens 4. Common



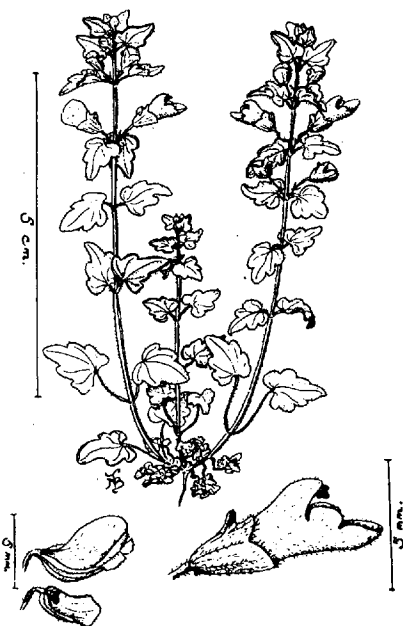
316. *Marrubium vulgare*



317. *Lamium amplexicaule*



318. *Westringia eremicola*



319. *Scutellaria humilis*

weed of waste ground and roadsides, widely naturalised in Australia but of Mediterranean origin. 'Horehound'. Fig. 316.

**M. vulgare* L.

5. LAMIUM L.

Ascendent annual herb, stems often purplish and with sparse retrorse hairs; stem leaves 1-2 cm. long on slender petioles; blades orbicular or broadly ovate, crenate; floral leaves sessile, orbicular-reniform, 1.5-3 cm. long, crenate, hairy, stem clasping and cupular around the flower clusters; flowers subsessile, sometimes with short corolla which fails to open (cleistogamous); calyx villous, striate, 4-5 mm. long, lobes short and subulate, often purplish; *chasmogamous flowers*: corolla pink to pale purple with narrow tube more than twice as long as calyx and broadened in upper third, upper lip hooded and villous with purple glandular hairs, lower lip with spreading bifid central lobe; stamens 4, anthers hairy; stigma bifid; *cleistogamous flowers*: corolla barely twice as long as calyx, with tuft of red or purple glandular hairs at apex. Nutlets brown, trigonous, inner faces with white spots. An occasional weed of gardens and waste ground in vicinity of Canberra; of European origin but naturalised in settled districts of temperate Australia. Can cause the disease 'staggers' if eaten by stock. 'Dead Nettle'. Fig. 317.

**L. amplexicaule* L.

6. WESTRINGIA J. E. Sm.

Bushy shrub to 2 metres high, scabrid-pubescent with short appressed hairs but later glabrescent; leaves mostly in whorls of 3, linear, 5-15 mm. long, shortly petiolate, margins revolute; flowers solitary in axil of each leaf of a whorl, pedicels short with pair of minute bracteoles; calyx 6-8 mm. long, appressed hairy, divided to middle into lanceolate lobes with prominent midrib and recurved margins (when dry); corolla pale violet, purple spotted within, villous with spreading hairs outside, tube as long as calyx but slender, upper lip 2-lobed, lower with central lobe notched and undulate; fertile stamens 2, sterile filaments with pale linear appendages (abortive stamens?); style bifid; nutlets rugose. Not common in the A.C.T. but found in dry sclerophyll habitats of river and creek banks at low altitudes, e.g. near Cotter Pumping Station, Booroomba, and Paddy's River; also Queensland to Victoria. Fig. 318.

W. eremicola A. Cunn. ex Benth.

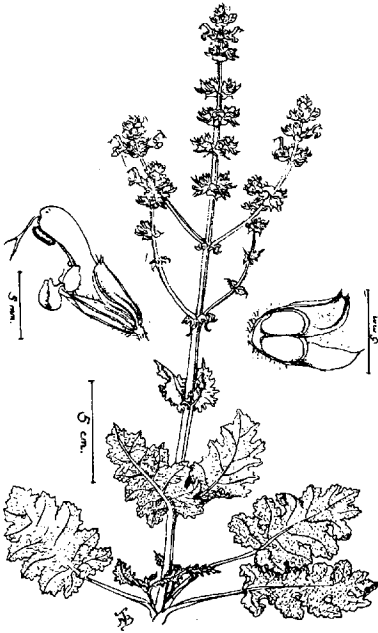
7. SCUTELLARIA L.

Slender perennial herb to 20 cm. high, angles of stems with upcurved hairs; leaves petiolate, broadly ovate or cordate, 6-9 mm. long, crenate, subglabrous above, lower surface with curved hairs on veins and oil glands; flowers solitary in upper axils, pedicels as long as or longer than calyx and with pair of minute bracteoles near base; calyx 3 mm. long, campanulate with 2 entire lips the upper with a conspicuous pouch, purplish-red; corolla red with white markings or pale, sparsely and minutely hairy; upper lip hooded with stamens and style slightly protrudent; lower lip with central lobe longer and concave; in fruit the calyx enlarges, the upper lip broadens, the pouch becomes concave with a scarious margin but the lip later falls to expose narrow lower lip and receptacle from which the nutlets have fallen. Not uncommon but often less than 10 cm. high and easily overlooked, found in dry forest habitats and in disturbed areas in wide range of altitudes from Canberra to Mt Coree and southwards; normally flowers in November but some flowers may open after rains in late summer; also New South Wales to Tasmania and South Australia. 'Australian Skullcap'. Fig. 319.

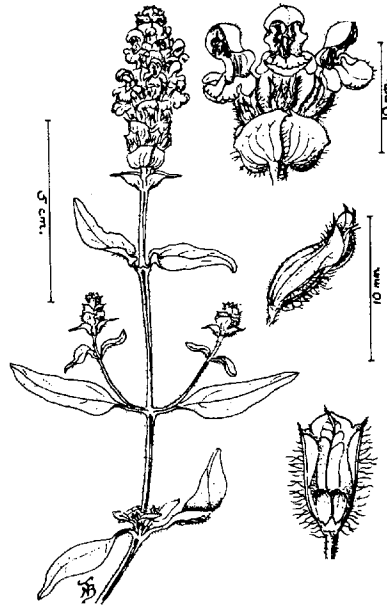
S. humilis R.Br.

8. SALVIA L.

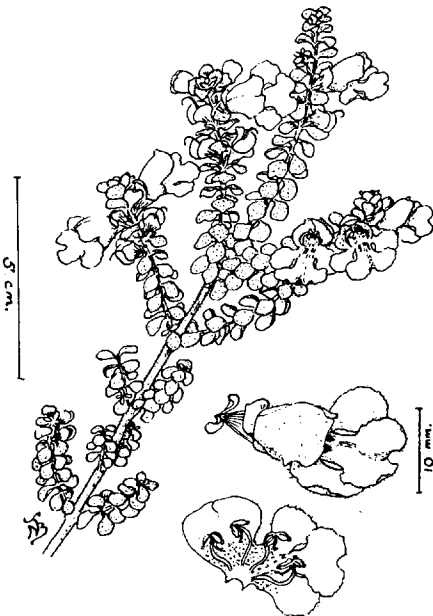
Perennial herb with pubescent angular stems often reddish-purple on angles; leaves



320. *Salvia verbenaca*



321. *Prunella vulgaris*



322. *Prostanthera cuneata*



323. *Datura stramonium*

mostly radical, broadly oblong or broadly ovate, to 20 cm. long, 10 cm. wide, wrinkled-reticulate with incised veins, margins crenate and sinuately lobed, petiolate; stem leaves similar but sessile, grading above into leafy bracts below main branches of panicle; flowers in false whorls subtended by broadly ovate bracts shorter than calyces; calyx pubescent with pilose and glandular hairs but upper lip glabrous or almost so between nerves, 5-6 mm. long, lobes minute with subulate-mucronate apices; lower lip with 2 acuminate lobes; corolla deep blue or purplish blue; long upper lip hooded, straight or falcate, as long as or longer than tube; stamens enclosed in hood, style exserted; lower lip with central lobe broad and concave above a narrow base; nutlets black, slightly angular on inner face. Flowers with corolla barely twice as long as calyx (1 cm. long instead of 2 cm.) are not uncommon and may be found among late flowers of a single inflorescence. Such small flowers may be cleistogamous. A common weed of gardens, waste and cultivated ground throughout the A.C.T.; native to Europe and Asia but widely naturalised throughout temperate Australia and Tasmania. 'Wild Sage'. Fig. 320.

***S. verbenaca L.**

Note: Australian material has been referred to *S. horminoides* Pourr. but it is uncertain whether this is distinct at the species level. It is reported to have two white spots at base of lower corolla lip, a character which has been observed in some local plants.

9. PRUNELLA L.

Erect perennial herb with few stems which are angular with scattered or (on young parts) dense crisped hairs; leaves ovate, lanceolate or elliptical, 2-5 cm. long, obtuse, margins entire or with shallow teeth and sometimes undulate, multicellular hairs present on nerves of undersurface, lower leaves petiolate; flowers in dense terminal bracteate spikes; false whorls partially hidden by broadly ovate or orbicular, scarious, purple-red veined bracts 5-7 mm. long, apices narrow; calyx 7-9 mm. long, upper lip with 3 short ovate-acuminate lobes, lower with 2 lanceolate-acuminate lobes, lobes minutely ciliolate; corolla purple, tube slightly longer than calyx, upper lip hooded, lower lip spreading with large denticulate central lobe; nutlets glabrous. Usually in wet habitats such as roadside drains or near creeks in forested gullies; almost cosmopolitan, naturalised(?) in eastern Australia from Queensland to Tasmania and South Australia. 'Self Heal'. Fig. 321.

***P. vulgaris L.**

10. PROSTANTHERA Labill.

1. *Tall bushy shrub to 4 metres high; leaves aromatic, lanceolate to elliptical, 4-8 cm. long, margins entire or finely denticulate, lower surface pale and with oil glands; flowers in short leafy panicle terminal to branches, pedicels short with pair of bracteoles near base of calyx; calyx 4-5 mm. long, striate, hoary, the 2 obtuse lips about as long as tube and loosely closed after flowering; corolla whitish or pale lilac, spotted with purple within, tube campanulate, slightly longer than calyx, densely villous outside, upper lip slightly hooded, lower 3-lobed, lobes undulate and spreading. Common shrub of mountain gullies, along creek margins and near swamps especially at mid to high altitudes; also Queensland to Tasmania and possibly Mt Gambier area of South Australia. 'Mint Bush', 'Victorian Christmas Bush'.*

1. P. lasianthos Labill.

1a. *Low bushy shrub to 1 metre high, stems minutely pubescent; leaves crowded, aromatic, obovate to cuneate, 4-7 mm. long, very shortly petiolate or subsessile, thick when fresh but when dry both surfaces pitted with oil glands, margins slightly recurved or blade concave above and reflexed; flowers solitary in upper axils, pedicels short; calyx 5-7 mm. long, both lips broad, later closed over fruit; tube striate, with numerous oil glands, not pubescent; corolla white with purple markings within, pubescent outside, tube campanulate and nearly*

twice as long as calyx; upper lip short, ciliate and notched; lower broadly 3-lobed, central lobe notched; stamens 4, covered by upper lip, each anther with slender fringed appendage. On exposed slopes or near granite outcrops at high elevations, Mt Gingera, Mt Bimberi, Mt Murray etc., also south-eastern New South Wales, Victoria, and Tasmania. 'Alpine Mint Bush'. Fig. 322.

2. *P. cuneata* Benth.

SOLANACEAE

1. Fruit a spiny capsule; stamens enclosed in long slender corolla tube.

1. *Datura*

1a. Fruit a berry; stamens exerted or in mouth of tube or exposed by spreading corolla.

2. Flowers solitary or paired in leaf axils or among short leaf clusters; anthers opening to base.

3. Smaller branches ending in spines, anthers exerted; berry orange or red; intricately branched shrub.

2. *Lycium*

3a. Perennial herb with weak herbaceous stems; without spines; anthers in mouth of tube; berry white or pale yellow.

3. *Salpichroa*

2a. Anthers opening by apical pores or slits which later may extend to base; epidermal spines present or absent on stems, leaves and calyces.

4. *Solanum*

1. *DATURA* L.

Robust erect annual to 1.5 metres high; leaves ovate, margins with sharply toothed lobes, upper leaves 6-12 cm. long, petioles slender; flowers solitary, each terminating a shoot on which the uppermost laterals grow out to terminate in another flower, thus forming a leafy cyme of forked branches; calyx tubular, 5-toothed, 3.5-5 cm. long, later circumsciss near base; corolla white, tubular to funnel-shaped, 5.5-7.5 cm. long, spreading limb with short acuminate lobes; capsule erect, reflexed base of calyx forming a frill, covered with numerous spines of which the longest are up to 5 mm. long, loculicidal and to lesser extent septicial; seeds black, kidney-shaped, minutely pitted. Unpleasantly scented weed of waste ground, especially on alluvium near Molonglo and Murrumbidgee rivers, spread by floodwaters; native to Asia but naturalised in many countries including areas of temperate Australia, seeds poisonous to stock. 'Common Thorn Apple'. Fig. 323.

**D. stramonium* L. var. *stramonium*

Note: *D. stramonium* L. var. *tatula* (L.) Torr. may also occur in the A.C.T. It has purplish stems and purplish corolla. *D. ferox* L., 'Long-spined Thorn Apple', may be semi-naturalised in CSIRO grounds on Black Mountain. The capsules bear fewer but longer spines and the seeds are larger.

2. *LYCIUM* L.

Intricately branched shrub to 2 metres high, grey branchlets spreading at right angles, the smaller ones ending in spines; leaves in clusters along branches, rather fleshy, oblanceolate to spatulate, 1-3 cm. long, obtuse; flowers solitary or paired among leaves, slender peduncles about as long as the tubular calyces (6-8 mm.) which have 5 broad lobes; in fruit the calyx cupular and 2-lipped; corolla tube slightly longer than calyx, white with dark streaks within, stamens with slender filaments and short anthers; berry globose or ovoid, 10-14 mm. long, orange or red. Native to Africa, once used as a hedge plant but now a declared noxious weed in most parts of Australia due to the poisonous berries; naturalised

on higher ground in and near Canberra, also lower areas between Duntroon and Fyshwick (some from old hedges). 'African Boxthorn'. Fig. 324.

**L. ferocissimum* Miers

3. SALPICHROA Miers

Straggling perennial herb, sparsely hairy; leaves alternate, blades thin, ovate-rhomboid, 1.2-5 cm. long, 8-15 mm. wide, petiole slender; flowers axillary, mostly solitary, slender peduncle later reflexed; calyx hairy, deeply lobed, about 2 mm. long; corolla white or almost so, tube 6-7 mm. long, constricted at throat, lobes short, spreading; anthers in orifice or shortly exerted; berry ovoid to oblong, yellowish. Of South American origin, a naturalised garden weed in various parts of temperate Australia and Tasmania; not common in the A.C.T. 'Pampas Lily-of-the-Valley'.

**S. origanifolia* (Lam.) Baill.

4. SOLANUM L. See Baylis (1963), Symon (1967)

1. Plants without spines; leaves not tomentose on lower surface.

2. Shrubs 1-3 metres high; corolla pale or deep purple.

3. Herbaceous shrub to 3 metres high, glabrous or almost so; branchlets commonly purplish, not or scarcely angular with decurrent ridges; leaves petiolate, linear to linear-lanceolate, occasionally with one or two acuminate lobes towards base (especially on lower leaves), 5-15 cm. long, 4-15 mm. wide, acute acuminate or (rarely) obtuse; flowers in cymose racemes of 3-4 in upper axils, pedicels thickened at summit; calyx 5-6 mm. long, somewhat enlarged in fruit, campanulate with broad acute lobes shorter than tube; corolla deep violet to deep purple, spreading to diameter of 2.5-4.0 cm., lobes broad and emarginate; stamens erect, anthers usually subequal to or longer than their filaments, dehiscing by subapical slits; berry more or less globular, deep sulphur yellow with mahogany blush when ripe, 1.2-2.1 cm. long, 1.2-2.0 cm. wide, ripe seeds and stone cells pale straw-coloured. In disturbed dry sclerophyll habitats such as margins of young pine plantations; common in vicinity of Lake George; also coastal ranges and tablelands from Sydney to Victorian border. One of the species commonly called 'Kangaroo Apple'. Fig. 325.

1. *S. linearifolium* Herasimenko

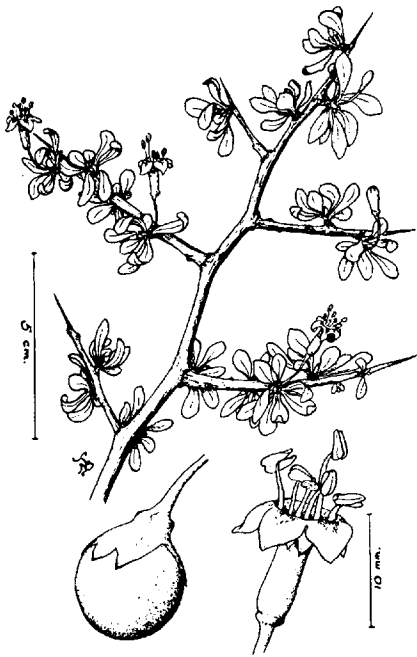
3a. Shrub similar to preceding but differing as follows: branchlets usually green, angular with decurrent ridges from leaf bases; corolla pale violet; filaments subequal to or slightly longer than their anthers; fruit larger, 1.7-3.0 cm. long, 1.8-3.1 cm. wide, ripe seeds brown to dark brown. Mostly coastal in distribution; New South Wales, Victoria, and Tasmania; not common and probably introduced in the A.C.T. where it occurs in the vicinity of pine plantations in the Tidbinbilla Valley. 'Gunnyang'.

2. *S. vescum* F. Muell.

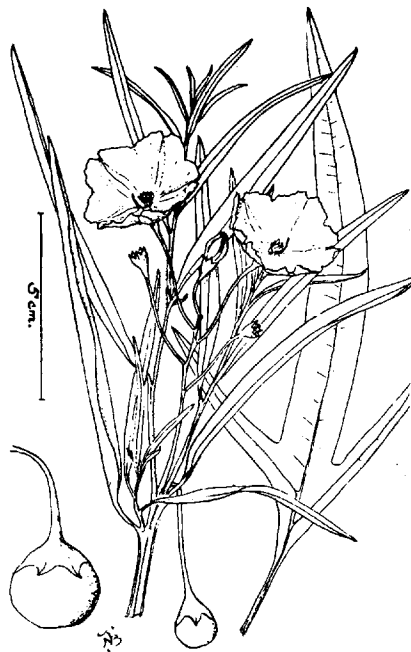
2a. Annual herbs less than 1 metre high (sometimes overwintering); flowers small with white (rarely pale purple) corollas.

4. Erect annual (rarely biennial), sparsely pubescent or glabrescent; leaves petiolate, rhomboid to ovate, entire or sinuate on margin, 3-6 cm. long, often slender towards apex; flowers in axillary racemes (sometimes umbellate), pedicels reflexed in fruit; corolla 6-7 mm. long, lobes lanceolate and reflexed; anthers with apical slits that later open to base; berry green turning black when ripe, 5-9 mm. diameter. Almost cosmopolitan weed of cultivated and waste areas or disturbed vegetation, common near settlements in the A.C.T. Reputedly poisonous though reports state that children have eaten ripe berries of some forms of this variable species without being affected greatly. Also widespread throughout temperate Australia. 'Blackberry Nightshade'.

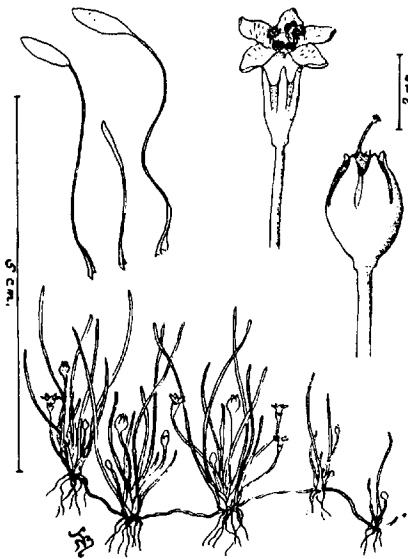
3. **S. nigrum* L. sens. lat.



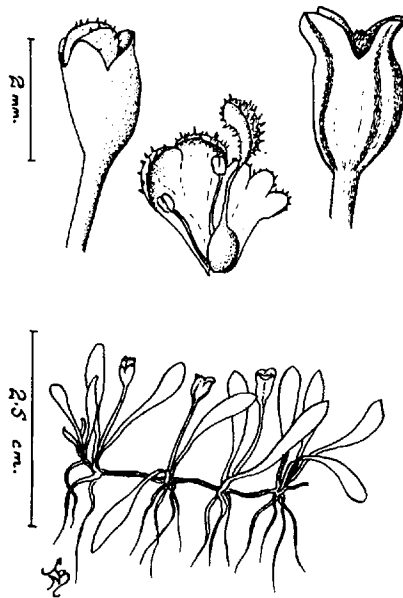
324. *Lycium ferocissimum*



325. *Solanum linearifolium*



326. *Limosella australis*



327. *Glossostigma diandrum*

4a. *Prostrate or ascendent* herb, sometimes with offensive odour, subglabrous or antrorsely scabrid with tubercle based hairs on undersurfaces of leaves and young shoots; *leaves deeply pinnatifid*, 5-10 cm. long, lobes narrow and sometimes themselves lobed, margins recurved; racemes axillary, *1-3-flowered*, flowers sometimes subtended by or the rhachis terminating in pinnatifid leafy bracts; calyx 2-3 mm. long, deeply lobed; corolla minutely pubescent, white or pale purple barely twice as long as calyx; fruiting pedicels reflexed, berry globose, *green or greenish-yellow*, 9-12 mm. diameter. Of American origin, naturalised in New South Wales, Victoria, and South Australia; not uncommon in the A.C.T., on waste ground, along roadsides or around rabbit warrens. 'Three-flowered Nightshade'.

4. **S. triflorum* Nutt.

1a. *Shrub* to 1 metre high but commonly less, *branches tomentose with stellate hairs when young*, later more or less glabrescent, *covered with spreading orange or yellow spines up to 1 cm. long*; leaves lanceolate or oblong with sinuate margins, larger leaves pinnatifid and undulate, green above and glabrous except along veins, *white or grey with stellate tomentum beneath, both sides with projecting spines*; flowers pedicellate in short cymes in upper axils; *calyx clothed with numerous spines* smaller than those of stem and leaves; *corolla purple*, up to 3.5 cm. in diameter, spreading lobes with stellate hairs outside and minute apiculate apices; calyx enlarged around base of fruit; berry 2-2.5 cm. diameter, mottled green but drying brown when old. Native species, poisonous to stock, especially the fruits; not common in the A.C.T. but collected from Molonglo Gorge and Mugga Lane; more common in western New South Wales and South Australia. 'Narrawa Burr'.

5. *S. cinereum* R.Br.

SCROPHULARIACEAE

1. Plants stoloniferous in wet mud, commonly less than 5 cm. high; flowers less than 3.5 mm. long.

2. Leaves narrow linear-terete above scarious base, sometimes with linear-elliptical blade at summit; calyx and corolla 5-lobed; style with small globular stigma.

1. *Limosella*

2a. Leaves oblanceolate, without scarious base; calyx and corolla 2-lipped, style with broad, spatulate, papillose stigma.

2. *Glossostigma*

1a. Plants not as above; flowers more than 3 mm. long or in bracteate racemes.

3. Leaves alternate on flowering stems or radical.

4. Corolla yellow, without basal spur; stamens 5.

3. *Verbascum*

4a. Corolla deep purplish-blue, with conspicuous basal spur; stamens 4.

4. *Linaria*

3a. Leaves opposite; if flowers are in racemes then bracts may be alternate.

5. Calyx with 5 lobes or segments; upper corolla lip not hooded; flowers axillary.

6. Flowers on slender peduncles; calyx tubular; style with 2 broad stigmatic lobes; corolla yellow.

5. *Mimulus*

6a. Flowers pedunculate or sessile; calyx lobed to near base; style bent at summit with single broad stigmatic lobe; corolla pink.

6. *Gratiola*

5a. Calyx with 4 teeth or lobes.

7. Upper lip of corolla hooded or curved over the 4 stamens; leaves lobed, stems often purplish.

8. Flowers dark purple or purplish-red; corolla tube narrow.

7. *Parentucellia*

8a. Flowers creamy-white, pink or pale purple; corolla tube campanulate and broadened upwards.

8. *Euphrasia*

7a. Corolla with 4 spreading lobes, blue or white; stamens 2.

9. Herbs; capsule obcordate (except in *V. angallis-aquatica*) at first opening loculicidally and later splitting into 4 rounded-obtuse valves.

9. *Veronica*

9a. Native perennial herbs or subshrubs; capsule compressed ovoid, narrowed above, dehiscent septically and splitting into 4 short spreading valves.

10. *Parahebe*

1. *LIMOSELLA* L.

Small glabrous aquatic herb with leaves clustered at nodes of stolon; leaves slender, linear-terete with broader scarious base and sometimes with linear-elliptical blade at the summit, 1.5-4 cm. long; flowers on slender peduncles shorter or longer than leaves; calyx 2-3 mm. long, lobes short; corolla slightly longer than calyx, obtuse lobes shorter than tube; white or tinged with purple; stamens 4; style asymmetrically placed on ovary, stigma minute, globular; capsule obovoid-globose, about as long as persistent calyx; seeds furrowed and with minute transverse striations. Widespread in temperate regions of southern hemisphere including Australia; in mud or shallow water on margins of pools or swamps. 'Mudwort'. Fig. 326. (Formerly referred to *L. aquatica* L. but this name is restricted to plants from the northern hemisphere. Brown's name has priority over *L. lineata* Glück (1934).)

L. australis R.Br.

2. *GLOSSOSTIGMA* Wight et Arn. ex Arn.

Small glabrous herb rarely more than 1.5-2 cm. high; leaves commonly paired at nodes of stolon, oblanceolate, obtuse; flowers solitary at nodes; peduncles erect, short or nearly as long as leaves; calyx 1.5-2 mm. long, cupular but slightly oblique, upper lip with 2 short obtuse lobes, lower entire; corolla as long as calyx or slightly longer, bluish-white or very pale mauve, lobes spreading or the upper lip of 2 hooded lobes papillose on the outside loosely covering shorter 3-lobed lower lip; stamens 2; style curved, broadened to large stigma which is papillose on part or most of the convex face. Widespread from Queensland to South Australia but easily overlooked; in the A.C.T. has been collected from mud on Yarralumla bank of Lake Burley Griffin, on margin of pool near source of Gibraltar Creek and on Mt Gingera. In the two latter cases the plants were mixed with *Pilularia*. The Australian representatives need critical study and may include more than one species. Fig. 327.

G. diandrum (L.) Kuntze

3. *VERBASCUM* L.

1. *Very densely white-woolly tomentose biennial herb*, with dense tuft of radical leaves in first season and erect leafy stem with terminal inflorescence up to 2 metres high in second; radical leaves ovate, obovate, or oblong-elliptical, to 30 cm. long, densely tomentose on both faces, narrowed below to short petiole; stem leaves lanceolate to elliptical, acute-acuminate, tomentose, decurrent in wings on the stems, uppermost grading into woolly ovate bracts subtending the flower clusters of the spicate inflorescence; calyx deeply lobed, 6-9 mm. long, tomentose; corolla yellow, 12-20 mm. in diameter, lobes widely spreading in flower; stamens 5, 3 of the filaments with pale woolly hairs, the other 2 glabrous or sparsely hairy; capsule globular, seeds minute, rugose, numerous. Of European origin, now naturalised in temperate areas of southern and eastern Australia and Tasmania; in the A.C.T. locally common in some pastures on valley slopes and in disturbed habitats along river and creek banks. Sometimes mistakenly called 'Wild Tobacco'. 'Great Mullein'.

1. **V. thapsus* L.

1a. Plants not densely tomentose with stellate hairs; stem leaves not decurrent; inflorescence with glandular hairs; all staminal filaments with coloured hairs.

2. Erect biennial herb forming dense rosette in first season; radical leaves lanceolate or elliptical, to 30 cm. long, *sparsely glandular-pubescent* but more so on undersurface, margins irregularly crenate or toothed, narrowed below into winged petioles; *erect stem minutely glandular-pubescent and also with longer branched or stellate hairs*, to 1 metre high (with inflorescence); stem leaves sessile, broad at base and cordate, more or less clasping, grading into bracts above, less crenate than lower leaves; *flowers clustered on short pedicels* in axils of bracts in a spicate inflorescence; calyx 6-7 mm. long, glandular-pubescent, deeply lobed, not much enlarged in fruit; corolla yellow, spreading, 2-3 cm. diameter, lobes shallow, glandular-pubescent outside; capsule globose, not much longer than calyx, minutely glandular-pubescent. Of European origin now widely naturalised in temperate Australia and Tasmania, common in the A.C.T. on waste or cultivated areas. 'Twiggy Mullein'. Fig. 328.

2. *V. virgatum Stokes

2a. Erect biennial of more slender habit than preceding, *radical leaves glabrous*, oblong-elliptical, narrowed below, 10-25 cm. long, irregularly crenate or sinuate; stem leaves glabrous, sessile with broad bases as in preceding; *stem glabrous below inflorescence* but glandular-pubescent on rhachis; *flowers solitary on slender pedicels longer than calyx*; calyx about 5 mm. long (to 8 mm. in fruit), deeply lobed, glandular-pubescent; corolla pale yellow; capsule as in preceding. Of European origin, naturalised in temperate Australia and Tasmania; less common in the A.C.T. than the preceding two species but in similar habitats. 'Spurious Mullein', 'Moth Mullein'.

3. *V. blattaria L.

4. LINARIA Mill.

1. Slender glabrous annual, *sterile lower branches bearing elliptical-lanceolate leaves* 2-8 mm. long in whorls of 3; flowering stem erect, simple, with linear-terete alternate leaves 1-4 cm. long; raceme at first short and dense, lengthening in fruit; calyx divided to base, 4-5 mm. long, lobes subulate; *corolla deep blue or deep, purplish-blue, with slender spur* 7-9 mm. long, lower lip with pouched swelling which closes throat; *capsule with 2 subglobose cells*, seeds flat with *marginal cilia*. Of European origin, naturalised in New South Wales and Victoria; in the A.C.T. found in grassy habitats in disturbed woodland or dry forest. 'Pelisser's Toadflax'. Fig. 329.

1. *L. pelisserana Mill.

1a. Annual herb, *sterile branches with linear leaves like those of flowering stem* though smaller, the lowest in whorls, the upper alternate; *rhachis of raceme and calyces with glandular hairs*; calyx about 1.5 mm. long (to 4 mm. in fruit), deeply lobed, *corolla pale below, bluish above, spur 1-1.5 mm. long*; capsule not divided into subglobose cells, soon splitting into 6 valves; *seeds with entire winged margin*. Plants usually smaller than in preceding. Of European origin, naturalised in New South Wales; not common in the A.C.T. but probably often overlooked; has been collected in Queanbeyan area, in Tidbinbilla area, and on Mt McDonald.

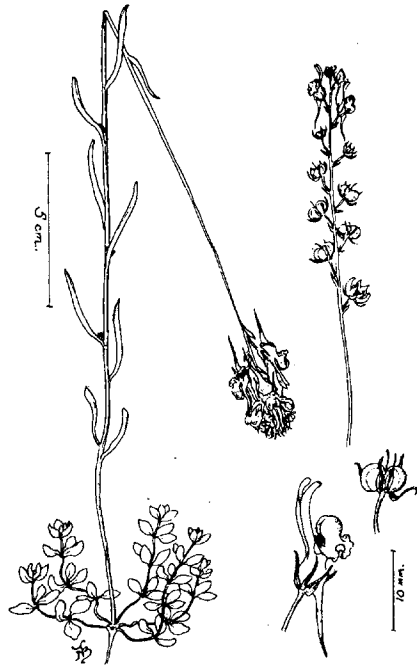
2. *L. arvensis (L.) Desf.

5. MIMULUS L.

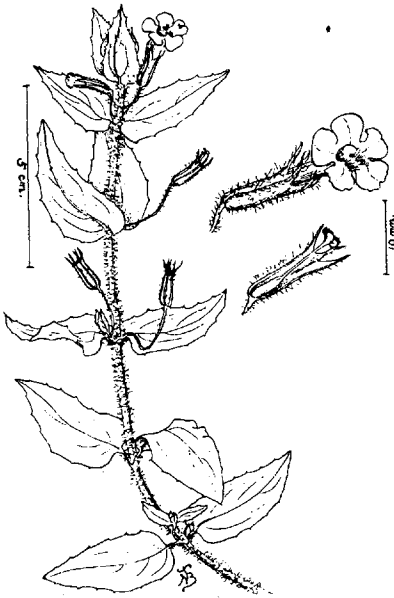
Ascendent or procumbent villous herb, hairs sticky or moist; leaves opposite, lower shortly petiolate, upper sessile, ovate and acute, 2-6 cm. long, 1.5-3.5 cm. wide, margin with shallow teeth, sparsely villous; flowers axillary, upper peduncles shorter than lower; calyx 9-11 mm. long, tube angular, teeth acuminate and about $\frac{1}{2}$ as long as tube; corolla golden-yellow, tube to twice length of calyx, limb spreading, lobes rounded-obtuse, lower



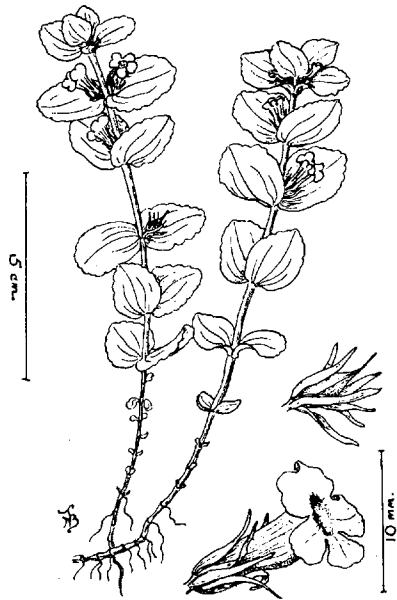
328. *Verbascum virgatum*



329. *Linaria pelisserana*



330. *Mimulus moschatus*



331. *Gratiola latifolia*

two with lines of golden hairs pressing into the throat; stamens 4; style as long as calyx, stigmatic lobes flat. A native of western North America, formerly grown in gardens, now naturalised in New South Wales, Victoria, South Australia, Tasmania, and New Zealand; in the A.C.T. naturalised on creek banks, swamps, and in roadside ditches in mountain areas. 'Musk Mimulus'. Fig. 330.

**M. moschatus* Dougl. ex Lindl.

6. GRATIOLA L.

1. Ascendent perennial herbs rooting from lower leafless nodes.

2. *Leaves broadly ovate or oval* (rarely broadly lanceolate) with rounded-obtuse apices; 5-nerved at base; 1-3 cm. long, 1-1.75 cm. wide (except in narrow-leaved forms), pale green, margins entire, undulate-crenate or with shallow teeth, glabrous or sparsely hairy; *flowers sessile or almost so*; bracteoles similar to sepals; calyx 5-6 mm. long, divided to base, when dry the sepals inrolled-subulate with callous apex slightly recurved, subglabrous or with minute glandular hairs or with longer hairs on margins and midrib; corolla pink with dark veins, *tube 2-2½ times as long as calyx*, sparsely glandular-pubescent; upper lip notched and *with numerous clavate hairs in throat* also simple hairs between fertile staminal filaments; *sterile filaments slender and short*; capsule compressed-ovoid with *acute to acuminate apex*; *seeds brown with thin fine reticulum*. In the A.C.T. common in wet mud marginal to or in shallow running water of minor creeks and swamps especially above 2500 ft; also in suitable habitats throughout temperate Australia and Tasmania, New Zealand(?). Formerly referred to *G. peruviana* L., a name also used for New Zealand plants with white to yellow flowers now placed as *G. sexdentata* R. Cunn. ex A. Cunn. Fig. 331.

1. *G. latifolia* R.Br.

2a. *Leaves narrow lanceolate*, obtuse at base, apex acute or obtuse, 1-2 cm. wide, sparsely glandular-hairy with or without scattered stout multi-cellular hairs or almost glabrous, 1-3-nerved, margins callous-toothed; *flowers pedunculate*, peduncles short or lengthening to as long as leaves; bracteoles shorter than calyx or almost as long; calyx 4-5 mm. long, sepals linear-lanceolate, obtuse; corolla pink, tube less than twice as long as calyx, sparsely and minutely glandular-hairy; upper lip emarginate with *long simple hairs in throat* similar to those between filaments; *sterile filaments absent*; capsule short and broadly compressed-ovoid, *obtuse*; seeds brown, reticulate. Uncommon in the A.C.T., collected at Duntroon and at Hall in damp areas near water; reported from various areas throughout temperate Australia but apparently rarely common.

2. *G. pedunculata* R.Br.

1a. *Low procumbent herb*, stems tangled in mats, rooting from leafless and leafy nodes; leaves narrow-oblong, narrowed to clasping base, 5-8 mm. long, 1.5-4 mm. wide, 1-3-nerved, obtuse, margins entire though with a few callosities, glabrous or almost so; flowers very shortly pedunculate; *bracteoles about ½ as long as calyx and gibbous at base*; sepals oblong-lanceolate, 4-4.5 mm. long; corolla pink, *tube less than twice as long as calyx*; sparsely glandular hairy; upper lip emarginate, *lacking hairs in the throat*, few simple hairs present between filaments; sterile filaments slender and about as long as fertile ones; capsule shortly and broadly compressed-ovoid with short acute apex; *seeds with conspicuous white reticulum*. Swamp ground in subalpine habitats; also south-eastern New South Wales, Victoria, and Tasmania. Local plants differ from Tasmanian material of *G. nana* s. str. in the narrower leaves, shorter corolla tube which lacks hairs in the throat.

3. *G. nana* Benth. sens. lat.

7. PARENTUCELLIA Viviani

Erect annual herb, stems commonly simple or branched from base, dark purple, clothed with short glandular hairs; leaves opposite or almost so, distant, ovate, 5-15 mm. long,

glandular-hairy, 3-7-lobed or toothed, margins recurved, radiating nerves channelled above, prominent below; flowers sessile, solitary in upper axils forming a terminal spike which later elongates; calyx tubular with short lobes similar to those of leaves, 8-10 mm. long, glandular-hairy, dark purplish-green; corolla dark purple, 11-13 mm. long, pubescent outside with hairs which are not always glandular tipped; upper lip short and hooded; lower spreading, 3-lobed and paler within; capsule 10-12 mm. long, slightly longer than swollen calyx. Naturalised throughout temperate Australia; locally common in the A.C.T. in unimproved pastures and grassy places. 'Common Bartsia'. Fig. 332.

**P. latifolia* (L.) Caruel

8. EUPHRASIA L.

Note: *Euphrasia* is known in both northern and southern hemispheres and is notorious for the difficulties encountered in species separation. A major treatment of the genus was prepared by Wettstein (1896) but so far as the Australian representatives are concerned it is unsatisfactory because he did not examine type specimens. The Tasmanian species have been clarified by Du Reitz (1948) but apart from comments on some Australian material he did not attempt to deal with mainland species. Among these there are a number which appear to lack names and the following treatment of the A.C.T. material is therefore tentative.

The best specimens for examination are those in which flowering has commenced and some capsules have been formed. Over-mature material is sometimes difficult to identify. The plants form parasitic root attachments but little is known as to the identity of the species attacked by *Euphrasia* in Australia.

1. Plants conspicuously glandular-hirsute or glandular-pubescent.

2. *Annual with erect stems simple or with branches from mid-nodes*; leaves 10-25 mm. long with 3-4 pairs of narrow divergent lobes and a longer terminal lobe, margins recurved but not thick; flower spike subcapitate at first, later elongating below the currently expanded flowers but lowest internodes rarely much longer than upper; lower bracts resembling leaves, sometimes subalternate but upper reduced to broad base with one pair of narrow lobes and a long terminal lobe about twice as long as calyx; calyx 6-8 mm. long, lobes linear-subulate, as long as or longer than tube; corolla 16-18 mm. long, pale to deep purple when fresh, dark bluish-purple when dry, sparsely pilose with soft hairs, throat pilose within, lobes of upper lip obliquely reflexed-erect with a deep narrow sinus between them; lobes of lower lip 4-5 mm. long, emarginate; anthers almost glabrous on the back; capsule pilose with simple hairs, oblong-obtuse, slightly longer than calyx. Common in late summer (February-March) in subalpine woodland especially near creeks and swamps; also in Australian Alps and Victoria.

1. *E. scabra* R.Br. var. *caudata*
J. H. Willis

2a. *Perennial with a number of unbranched erect stems from an ascendent base*, some elongating and terminating in flower spikes; leaves opposite or subopposite, 8-15 mm. long, oblanceolate or obovate with 2-3 pairs of short acute divergent lobes about as long as the broader terminal lobe, narrowed at base, margins recurved; spikes slender and pyramidal above the expanded flowers, lower pairs distant, bracts at least as long as calyces, the lobing of the uppermost reduced to one divergent pair; lower flowers pedicellate, calyx 6-9 mm. long, lobes lanceolate-acuminate, shorter than tube; corolla violet with dark veins within (when dry), 14-18 mm. long, with sparse glandular hairs on the hooded upper lip and in sinus between lips, throat glabrous except for hairs at bases of filaments, obtuse reflexed lobes of upper lip less oblique than in above and almost as broad as long, lower lip with rounded-obtuse lobes, all longer than broad, the central one narrower, longer and almost truncate; anthers hairy on back; ovary hairy on acuminate apex. Only one specimen examined—from

Eucalypt woodland at 3000 ft between Bull's Head and Bendora Dam (Cotter Valley) (Pullen 3861). The habit is that of the next species but the vestiture, conspicuous bracts, and the lobing of the calyx approach those of the above, the possibility that it is of hybrid origin cannot be excluded.

2. *E. sp.*

1a. Plants perennial, not glandular-hirsute, glandular hairs on leaves, bracts or calyces (if present) always minute and sessile; stems clothed with reflexed acicular or curved hairs often mixed with minute sessile glandular ones.

3. *Inflorescence with the expanded flowers at the base of pyramidal spike of buds* (except late in season when only terminal flowers remain), lowest 1 or 2 pairs sometimes distant; *bracts subtending uppermost flowers oval, elliptical or narrow oblong, usually entire but, if broad, sometimes with 1 or 2 shallow rounded lobes or crenulations.* Plants with numerous stems from ascendent base, the flowering ones to 40 cm. high, margins of leaves, bracts, and calyx lobes with or without minute white 'blisters' or very short conical hairs; leaves from narrow oblanceolate to obovate according to length of cuneate base, 10-18 mm. long with 2-3 pairs of obtuse lobes or serrations, margins recurved and slightly thickened; calyx 4.5-5.5 mm. long, glabrous or with few minute subsessile glandular hairs especially in sinus between lips; corolla 12-15 mm. long, pilose with long simple and short glandular hairs; throat glabrous except within hood of upper lip whose short broad lobes are reflexed; lower lip broadly obovate, obtuse, lateral lobes as broad as or broader than long; capsule glabrous, narrow ovoid-acuminate, 8-10 mm. long. Not uncommon in forest and subalpine woodland above 3500 ft, flowering November-December. Fig. 333.

3. *E. aff. paludosa* R.Br.

3a. *Inflorescence with expanded flowers subcapitate and more or less covering the very short cluster of unexpanded buds*, lower pairs of flowers rarely distant; *bracts subtending uppermost flowers with 1-2 pairs of acute more or less erect lobes only slightly narrower than terminal lobe.* Both the following belong to the complex linked with *E. glacialis* Wettst. which is glandular-hirsute.

4. Stems ascendent or erect from branched rhizomatous base; *leaves oblanceolate to obovate with cuneate base, 10-20 mm. long*, with 2-3 pairs of triangular lobes in upper half, broader terminal lobe obtuse and not much longer, thick margins often scabrid with short acicular hairs or white 'blisters'; *calyx 6-7 mm. long*, lobes lanceolate, shorter than tube, minutely glandular-pubescent including margins and inner faces of lobes where a few acicular hairs may also be present; *corolla 14-17 mm. long*, drying pale purplish but when fresh has a pale tube with lobes white, pink, or pinkish-purple with a conspicuous yellow patch at base of central lobe of lower lip, pilose outside and within throat; upper lip deeply lobed, lobes recurved-erect and obliquely orbicular-oblong; lobes of lower lip rectangular-cuneate, margins slightly emarginate; capsule ellipsoidal, glabrous, finally more than 1½ times as long as calyx. In alpine woodland above 4000 ft, flowering mid to late summer.

4. *E. aff. glacialis* Wettst.

4a. Less robust than the preceding, stems being 1 mm. diameter, flowering stems rather stiff, to 25 cm. high (including inflorescence), internodes 4-5 times as long as their leaves; *leaves 5-10 mm. long, narrow-oblong to narrow-oblanceolate* with 2 pairs of upward projecting lobes or teeth more acute than the broader apex, margins thick and glabrous or with acicular hairs similar to those of stems; bracts similar to leaves, usually more distinctly ciliate; *calyx 4.5-5.5 mm. long*, lobes less than ½ as long as tube, margins ciliate with acicular or simple hairs continued on to inner faces; *corolla 10-12 mm. long*, pale purple or bluish-purple when fresh, drying blue, sparsely pilose outside, also in throat and within hooded upper lip whose lobes are more reflexed than in preceding; capsule oblong-ellipsoid, obtuse,

sparsely ciliate at summit when young, longer than calyx. The slender stems with distant pairs of small narrow leaves give this an appearance quite different from material of *E. glacialis* var. *eglandulosa* though in the present state of our knowledge this seems to be the closest affinity. Subalpine woodland and swampy habitats above 4000 ft. Also Mt Kosciusko.

5. *E. aff. glacialis* Wettst. var. *eglandulosa* J. H. Willis

9. VERONICA L.

1. Erect perennial herb to 40 cm. high, *glabrous or with few glandular hairs on inflorescence only; leaves sessile and stem clasping*, opposite, lanceolate, acuminate, 3-10 cm. long, serrulate; *flowers pedicellate in many-flowered axillary racemes* finally longer than leaves; pedicels longer than calyces, subtended by narrow linear bracts; calyx 2-3 mm. long (to 4 mm. in fruit), divided to base in oblong-lanceolate or elliptical acute lobes; corolla pale blue, 4·5-5·5 mm. long; capsule ovoid, obtuse-emarginate, 4 × 3·5 mm. with style almost as long, about as long as calyx. Common in muddy habitats marginal to creeks or swamps or in shallow water. Native to temperate areas of the Old World but naturalised in many countries including parts of temperate Australia. 'Water Speedwell'.

1. **V. anagallis-aquatica* L.

1a. Flowers in terminal inflorescence or solitary in leaf axils; capsule obovate to deeply or broadly obcordate.

2. Fruiting pedicels shorter than subtending leaf or bracts; flowers in slender racemes which finally form most of the height of the often small plants; stems and leaves with glandular hairs.

3. Annual herbs 5-20 cm. high.

4. *Plants hirsute*, stems simple or branched from lower axils; leaves *ovate*, 4-12 mm. long, margin crenate, apex rounded-obtuse, lower ones petiolate; bracts alternate, lower lanceolate and crenate in lower half, upper oblong and slightly longer than shortly pedicellate flowers; calyx less than 2 mm. long (to 4 mm. in fruit), lower sepals longer than upper; corolla very pale blue or pinkish, shorter than calyx; capsule shorter than calyx, deeply obcordate with style about as long as sinus between lobes, 2·5-3 × 3·5-4 mm. Native to temperate Europe and Asia but naturalised in many countries, often of small dimensions in drier sites, in woodland area or along roadsides; widespread in temperate Australia and Tasmania. 'Wall Speedwell'.

2. **V. arvensis* L.

4a. *Herb glabrous on lower parts*, glandular-hairy above; stems simple and erect or with spreading branches; *leaves glabrous, oblong to oblanceolate* 10-15 mm. long, margins entire or subcrenate, lower ones narrowed to slender petiole; lower flowers in axils of sessile opposite leaves, upper alternate but subtended by bracts narrower than leaves but *much longer than flowers*; pedicels very short; calyx 2-3 mm. long (to 4 mm. in fruit), lobes lanceolate to oblong, subequal; corolla white to bluish, shorter than calyx; capsule broadly obcordate, 3 × 4 mm., shorter than calyx, style very short. In damp places in grassland or sclerophyll forest habitats. Of American origin but naturalised in temperate Australia and Tasmania. 'Wandering Speedwell'.

3. **V. peregrina* L.

3a. *Perennial herb* with weakly ascendent often simple stems, glandular-pubescent; *leaves subsessile* or petioles very short, oval to oblong, 7-15 mm. long, sparsely hairy, rounded-obtuse, margin subentire; alternate bracts ovate-oblanceolate to oblong; flowers on pedicels $\frac{1}{2}$ as long as bracts but almost as long as them in fruit; calyx about 2 mm. long (to 3·5 mm. in fruit); corolla pale blue with dark veins, slightly longer than calyx; capsule obcordate with shallow sinus and *long style*. Rooting from lower nodes in mud of swamp on Mt Ginini;

native to cold temperate areas of Europe, naturalised(?) New South Wales, Victoria, and Tasmania. 'Thyme-leaved Speedwell'.

4. **V. serpyllifolia* L.

2a. Fruiting pedicels long; stems with acuminate hairs or subglabrous; style long.

5. Annual decumbent-ascendent herb sometimes rooting from lower nodes; hairs of stems in decurrent series on opposite sides; *leaves broadly ovate to cordate*, 10-25 mm. long, sparsely hirsute, lower ones shortly petiolate; flowers in axils of sessile leafy bracts, pedicels hirsute and longer than leaves; calyx lobes to 4 mm. long (to 7 mm. in fruit), lips soon widely divergent; corolla bright blue with dark veins especially on upper lobe, longer than calyx; capsule with divergent lobes, shorter than calyx but twice as wide as long, sparsely hairy. A common garden weed in early summer; native of western Asia, naturalised in settled districts in some parts of temperate Australia and Tasmania. 'Creeping Speedwell'. Fig. 334.

5. **V. persica* Poir.

5a. Native perennial herbs, stoloniferous and rhizomatous, hairy or glabrous.

6. Stems trailing and stoloniferous, or rhizomatous with erect flowering shoots; stems hirsute, sometimes decurrently so; *leaves petiolate, cordate, or broadly ovate, crenate or serrate*, upper surface sparsely hirsute or glabrous, lower more or less hirsute on nerves; uppermost leaf pair sometimes lanceolate and serrate below inflorescence on erect shoots; flowers in axillary racemose cymes on prostrate branches or in terminal cymes on erect shoots; pedicels hirsute or almost glabrous, about as long as calyx in flower, much longer in fruit, bracts oblanceolate or elliptical, about as long as pedicels in flower; calyx 5-7 mm. long (7-8 mm. in fruit), *lobes oblanceolate*, hirsute at base and ciliate on lower margin (on erect stems) or densely hirsute below and ciliate on whole margin (prostrate stems); corolla blue to pinkish-blue; capsule obcordate, not deeply emarginate, shorter than calyx, ciliate. A species complex at present under study, common in sclerophyll forest habitats about 3500 ft but occasionally found at lower levels. 'Forest Speedwell'.

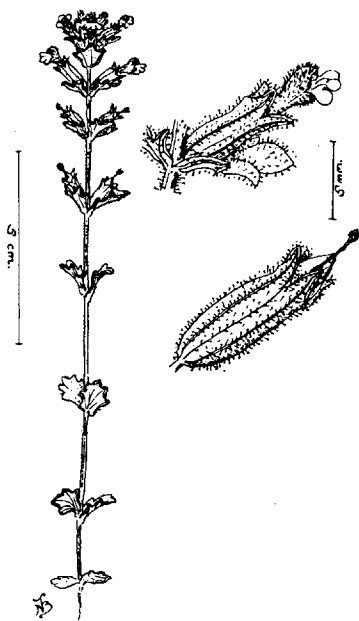
6. *V. calycina* R.Br. sens. lat.

6a. Rhizomatous perennial; stems erect, often simple, glabrous or minutely pubescent on upper parts; *leaves sessile, narrow-linear to narrow elliptical-lanceolate*, 10-20 mm. long, *acuminate*, margins more or less recurved (dry), entire or lowest with scattered teeth; flowers few in terminal cymes, pedicels 1-2 times as long as calyx, longer in fruit, *lobes oblong-elliptical*, minutely scabrid-ciliate; corolla pale blue, longer than calyx; capsule obcordate, sometimes broader than long, shorter than calyx.

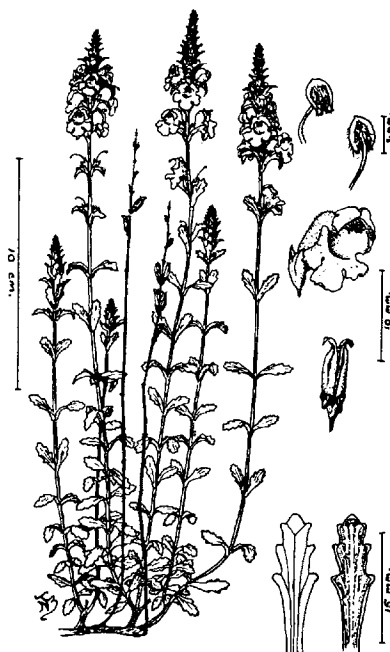
Note: There are two forms in the A.C.T.; that described above is found in cold woodland habitats near water and the stems are about 10 cm. long. In the second the plants are very slender, few-stemmed and found among grasses in swampy habitats in high cold valleys, the internodes are long, the long-pedicelled flowers have a calyx 4 mm. long with shortly acuminate elliptical lobes and the capsule is 3×4.5 mm. Like *V. calycina* this group is being critically studied.

7. *V. gracilis* R.Br. sens. lat.

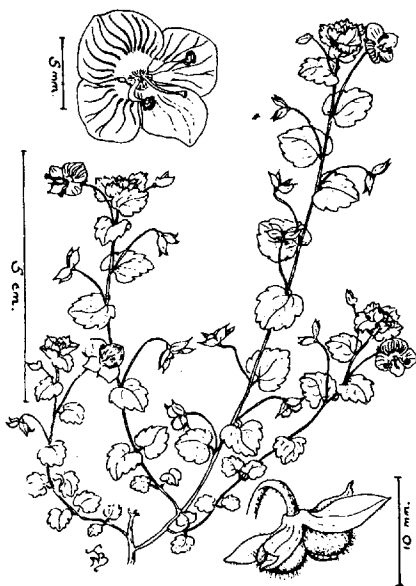
Note: *V. notabilis* F. Muell. ex Benth., an ascendent herb with serrate lanceolate leaves 3-7 cm. long, flowers pale in bracteate axillary racemes has been recorded for the A.C.T. but has only been observed in a gully at the Botanic Gardens, Black Mountain, where it may not be truly native for our area.



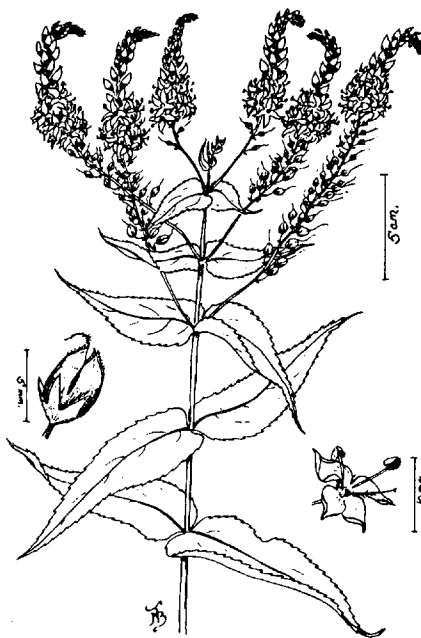
332. *Parentucellia latifolia*



333. *Euphrasia* sp.



334. *Veronica persica*



335. *Parahebe derwentiana*

10. PARAHEBE W. R. B. Oliver

1. Perennial to 1 metre high with numerous simple erect stems arising annually and dying during winter; stems stiff, sparsely hairy; *leaves broadly lanceolate, acuminate, finely serrate, 8-12 cm. long*, glabrous except when very young; racemes many-flowered, axillary in upper axils, forming a leafy panicle; rhachis and pedicels pubescent; bracts narrow-linear, acuminate, longer than pedicels in flower; calyx obtuse at base, 2-3 mm. long, lobes acuminate; *corolla white*, (sometimes outer surface pinkish on plants from high elevations or on buds), ovate lobes 6-8 mm. long, hairy at base, margins incurved to acute apex; *style hairy in lower half, ovary hairy above*; capsule about 5 mm. long, compressed ovoid with septum across narrow diameter, summit splitting into 4 valves, few hairs persistent on keels. Common in cold mountain gullies and shaded or cool slopes at higher elevations or on high ridges, occasional at lower levels; also common in mountain areas of New South Wales, Victoria, and Tasmania. The plants are perennial herbs rather than subshrubs as the shoots do not overwinter. 'White Veronica'. Fig. 335.

1. *P. derwentiana* (Andr.) B. Briggs
et Ehrend.

1a. Commonly few stemmed, shoots sometimes overwintering and hence more shrubby than preceding; stems slender, woody below, glabrous, sometimes reddish but often glaucous; *leaves entire, perfoliate, broadly ovate to almost orbicular, abruptly narrowed to acute or shortly acuminate apex*, glabrous and glaucous except when old, 3-6 cm. long, often as wide as long; racemes many-flowered, axillary as in preceding but glabrous and with loose or distant flowers; bracts narrow linear; pedicels short in flower, as long as calyx in fruit; calyx 3 mm. long (4 mm. in fruit), lobes narrow acuminate; *corolla blue or violet-blue, 8-10 mm. long*, hairy at base of ovate lobes; *style and ovary glabrous*, capsule compressed-ovoid, acuminate, slightly more than twice as long as calyx. Common in forest habitats from about 2000 to 5000 ft but growing in drier sites than the preceding species. 'Blue Veronica'.

2. *P. perfoliata* (R.Br.) B. Briggs
et Ehrend.

MARTYNIACEAE

PROBOSCIDEA Schmidel

Prostrate annual, stems trailing, sticky with viscid moist hairs; leaves opposite; blades spreading at top of erect petioles, orbicular-cordate or broadly ovate, 8-20 cm. long, obtuse; flowers pedicellate in short terminal racemes with pair of bracteoles immediately below or at base of spathe-like calyx whose upper lobe is the longest and which is split to base; corolla pink to purple with darker spots within, tube longer than calyx, wider above, 3 cm. long, limb of 5 unequal lobes, the upper 4 reflexed; stamens 4 in 2 pairs, enclosed; fruit a long capsule terminating in the rigid curved style that splits into long sharp claws, at first covered by hairy skin which falls away to reveal pitted surface and a crest along each upper margin. Of North American origin, naturalised in some areas of temperate Australia, a declared noxious weed in all States owing to injuries caused to grazing stock by the clawed fruits. In the A.C.T. it is rare but may spread along creeks and river banks. 'Purple-flowered Devil's Claw'.

P. louisianica (Mill.) Thell.

OROBANCHACEAE

OROBANCHE L.

Leafless root parasite with underground tubers; stem brownish tinged with purple, with

acuminate brown scales near the base, glandular-hairy; flowers spicate, scattered below, closer above, each subtended by an ovate-acuminate bract as long as or longer than corolla; calyx of lateral lips with slender bifid tips, about as long as corolla tube; corolla pale or veined with purple, 12-16 mm. long, tube not wider above, curved outwards and downwards; upper lip notched, projecting forwards, lower lip 3-lobed, central lobe broadly reniform, all lobes undulate or with crisped margins; stamens enclosed; capsule often opening on underside; seeds minute, black or dark brown. Parasitic on Skeleton Weed, clovers and other plants; seeds may contaminate soil left in clover and crop seed samples. Not common in the A.C.T.; native in Europe and North Africa, naturalised in various parts of temperate Australia. In A.C.T. occurs near Caravan Camp, Black Mountain, also near Scrivener Dam and on Mt McDonald. 'Lesser Broomrape'. Fig. 336.

**O. minor* J. E. Sm.

LENTIBULARIACEAE

UTRICULARIA L. See *Erickson (1968)*

Swamp plants only conspicuous when in flower; leaves in basal rosette and of two types; some being entire, spatulate, to 1.5 cm. long and placed above those submerged in wet soil; the latter are longer, branched and filiform like rootlets but bearing small white bladders; scape very slender, erect, 10-20 cm. high with few flowers; flowers clustered at first, paired, usually 3-4 per scape, slender pedicels subtended by minute bracts with thick bases; calyx of opposed lips to 3 mm. long; corolla purple; upper lip about twice as long as calyx, notched or entire, dark-veined; lower lip 10-15 mm. long and about as wide, spurred at base, with a pair of raised pouches in a yellow throat patch; capsule globose, slightly shorter than calyx. Flowering mid-summer at low altitudes, late summer at high levels. Common in swampy ground in open sites at most elevations in the A.C.T.; also distributed from Queensland to Tasmania and South Australia. The tiny submerged bladders on the modified leaves trap insects which decay in the fluid. 'Fairies' Aprons', 'Purple Bladderwort'. Fig. 337.

U. dichotoma Labill.

PLANTAGINACEAE

PLANTAGO L.

1. Bracts (or at least the lower ones) narrowed into slender acuminate apices as long as or much longer than the subtended flowers; flower spikes dense; introduced species.

2. Perennial herb, leaves radical, 15-30 cm. long, elliptical, narrowed to slender base which broadens at point of attachment, with 5-7-longitudinal nerves prominent on undersurface, subglabrous or sparsely hairy on nerves; margin entire or with distant minute teeth; spikes dense on long slender striate peduncles, ovoid but later cylindrical, up to 5 cm. long; bracts ovate with thick green centre, apex scarious and acuminate, glabrous or centre sparsely hairy; calyx of 2 fused (anterior) sepals (the pair of thick centres often hairy and apex emarginate), and posterior sepals with glabrous or ciliate keels; corolla glabrous, scarious, 4 spreading lobes broadly ovate with brown midribs; anthers large, exerted, apiculate; corolla persistent in fruit, capsule circumsciss near base, seeds 2, hollowed on inner face. Common weed of gardens and waste ground; native in Europe and Asia but widely naturalised in temperate countries including Australia. 'Ribwort Plantain', 'Ribgrass', 'Lamb's Tongue'. Fig. 338.

1. **P. lanceolata* L.

2a. Annual or short-lived perennial herb, radical leaves 1-nerved, pinnatifid with linear segments (rarely entire), subglabrous to hairy, 5-12 cm. long; spikes stiff, dense hard and cylindrical; bracts and flowers closely appressed; bracts ovate, narrow apices as long as

calyces or longer and projecting; sepals free, anterior pair with conspicuous ciliate crests; *corolla tube pubescent*, lobes ovate or ovate-lanceolate, acuminate; anthers with thin scarious apices; capsule circumsciss below middle, 3-4-seeded; seeds with hollow near hilum on inner face. Native to Europe and Asia but widely naturalised in many countries; may be found along roadsides or on waste ground in the A.C.T. 'Buckshorn Plantain'.

2. **P. coronopus* L.

1a. Spikes more than 5 cm. long, slender and cylindrical but loose and more or less interrupted towards base; bracts with short acute or obtuse apices, shorter than or as long as subtended calyces; bracts and sepals with thickened central portion prominent; leaves 3-5-nerved; corolla glabrous; native perennial herbs with woody rootstock.

3. *Leaves elliptical, often narrowly so, acuminate, gradually narrowed into a long slender petiole sometimes almost as long as blade*; blade with petiole 10-25 cm. long, blade 1-2.5 cm. wide, clothed with numerous multicellular hairs on both surfaces and on nerves of under-surface, usually shaggy-hairy on petioles except at base; margins with conspicuous but distant triangular teeth with callous tips; bracts about as long as sepals, acuminate-acute, usually densely hairy on back and ciliate; sepals hairy on keel; corolla lobes ovate, apiculate, about as long as broad; anthers with conspicuous apiculum. Common at lower elevations below 3000 ft.

3. *P. varia* R.Br. sens. lat.

3a. Resembling the preceding but differing in *leaves mostly broadly elliptical (from ovate-elliptical to obovate-elliptical), obtuse to acute, shortly narrowed to a relatively short and broad petiole*; blade with petiole 5-14 cm. long, blade 1.5-3.5 cm. wide, clothed with hairs as in preceding but these more sparse on upper surface though conspicuous on nerves of under-surface, not conspicuously shaggy on petioles; margins entire or with few irregular shallow teeth scarcely callous at their tips; bracts shorter than or equal to sepals; bracts and sepals glabrous or hairy; corolla as in preceding; anthers with small apiculum. Usually found above 3500 ft.

4. *P. antarctica* Decne.

RUBIACEAE

1. Erect shrubs; fruits succulent, yellow or red.

1a. Herbs with dry fruit or if subfleshy then whitish.

2. Leaves opposite.

3. Flowers 2-4 in cupular involucre in an umbellate inflorescence.

1. *Coprosma*

2. *Pomax*

3a. Flowers connate in head but not umbellate nor in cupular involucre.

3. *Opercularia*

2a. Leaves appearing whorled.

4. Calyx so reduced as to seem absent.

5. Corolla with distinct tube.

4. *Asperula*

5a. Corolla lobed almost to base.

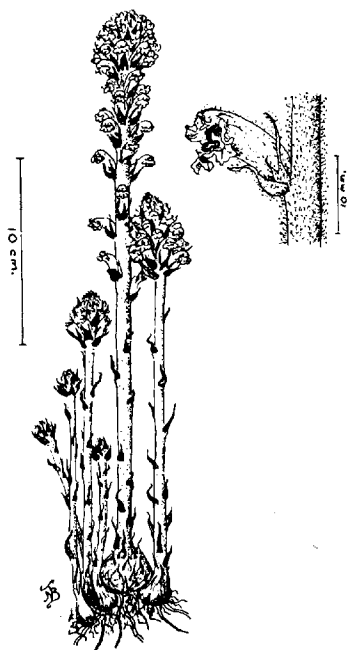
5. *Galium*

4a. Calyx 6-toothed, flowers in involucre of leafy bracts united at base.

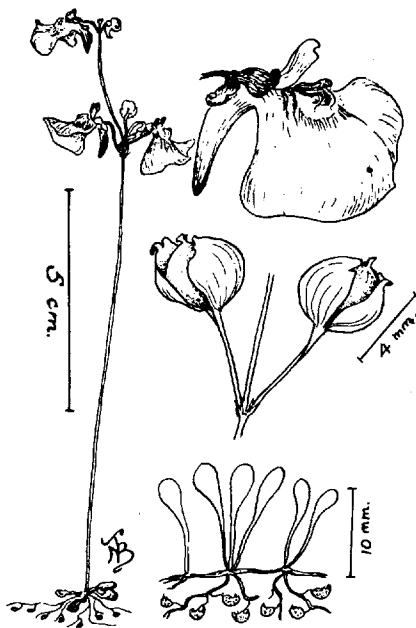
6. *Sherardia*

1. *COPROSMA* J. R. et G. Forst. See Oliver (1935).

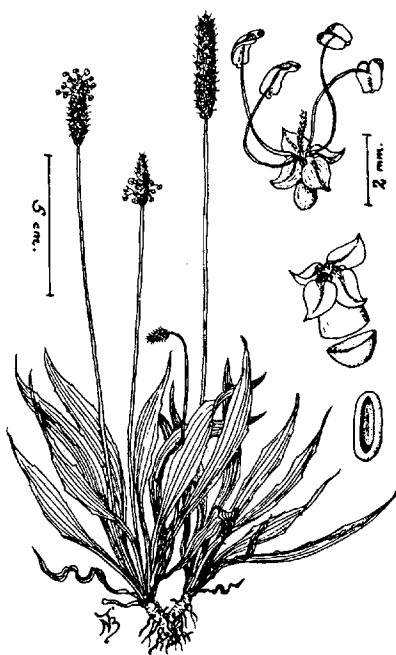
1. Shrub to 3 metres high, branches puberulent, shorter laterals often ending in slender spines; *leaves glabrous, lanceolate, oblong or elliptical*, 8-12 mm. long, paler beneath, shortly



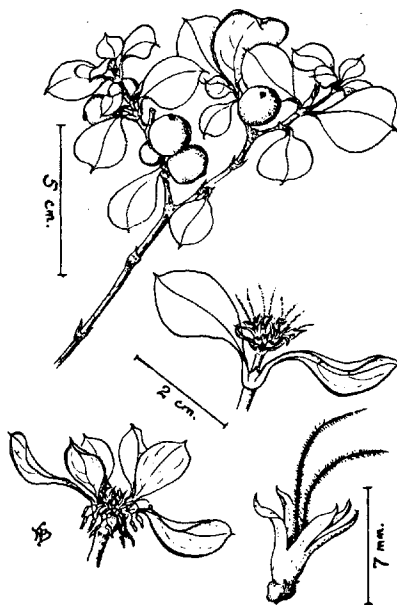
336. *Orobanche minor*



337. *Utricularia dichotoma*



338. *Plantago lanceolata*



339. *Coprosma hirtella*

petiolate; stipules forming a short sheath; flowers monoecious or dioecious, calyx very short, corolla 3-4 mm. long with short tube, style hairy; drupe orange or red, *ovoid*, 4-5 mm. long. In mountain gullies and on slopes in shaded habitats; also New South Wales, Victoria, and Tasmania. 'Prickly Currant Bush.'

1. **C. quadrifida** (Labill.) Robinson

1a. *Bushy shrub to 1.5 metres high, branches glabrous; leaves obovate or oblanceolate, 20-50 mm. long, mucronate, petiolate, paler beneath, scabrid above and glossy when fresh; stipular sheath with acute or acuminate point; flowers monoecious or dioecious, in short spikes in upper axils; drupe ripens to orange and then cherry-red, globular, 7-9 mm. diameter. Common species of subalpine forest habitats around 4000 ft and above in the A.C.T.; also New South Wales, Victoria, and Tasmania. Despite an attractive appearance the berries are not palatable. Plants often in thickets due to shoots from shallow roots. 'Currant Bush'. Fig. 339.*

2. **C. hirtella** Labill.

2. **POMAX** Sol. ex DC.

Erect tufted or rhizomatous perennial herb 10-30 cm. high with hirsute stems; leaves opposite, lanceolate-elliptical to oblanceolate, 7-12 cm. long, shortly petiolate; inflorescence a series of umbellate cupules forming most of upper part of plant; cupules campanulate with about 6 reddish obtuse or acute lobes shorter than tube (in fruit), each enclosing 2-4 flowers and enlarging to 4-5 mm. long in fruit; capsules covered by an operculum over 2-4 rough brown seeds with white reticulum. In dry sclerophyll habitats, e.g. Black Mountain and Mt Ainslie; also widespread throughout temperate Australia. A genus limited to Australia and usually regarded as having a single polymorphic species. Fig. 340.

P. umbellata (Sol. ex Gaertn.) Miq.

3. **OPERCULARIA** Gaertn.

Perennial herb with ascendent or decumbent stems from thickened rootstock; stems to 30 cm. high but often shorter, hispid with spreading hairs; stipular sheath with linear interpetiolar lobe; leaves opposite, ovate to lanceolate but narrowed at base, 10-20 mm. long, 4-7 mm. wide, acute or obtuse, margins recurved, scabrid-hispid above, paler beneath and hispid on midrib; flowers in clusters of 2-7 within a compound head either terminal to shoot or to short upper laterals, often lying in fork; peduncles scabrid-hispid, recurved and slightly longer in fruit; 2 narrow bracts below head; flowers united by their calyces, small and greenish, usually dioecious; males with large anthers hanging free; females with conspicuous papillose stigmas; in fruit the fused valves in each partial head form an operculum covering the seeds which are rugose on rounded back but pitted on either side of ridge on inner face. Not very common in the A.C.T., found in dry sclerophyll habitats such as Black Mountain and hills near Canberra; also New South Wales and eastern Victoria. Fig. 341.

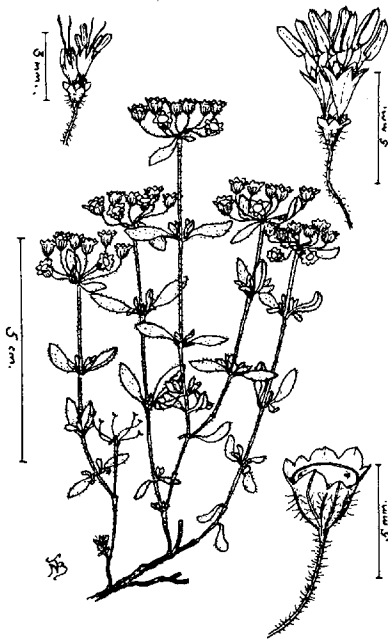
O. hispida Spreng.

4. **ASPERULA** L. *See Shaw and Turrill (1928)*

Note: The Australian species are dioecious and possibly generically distinct from northern hemisphere ones.

1. Midrib thick or prominent on undersurface of leaves.

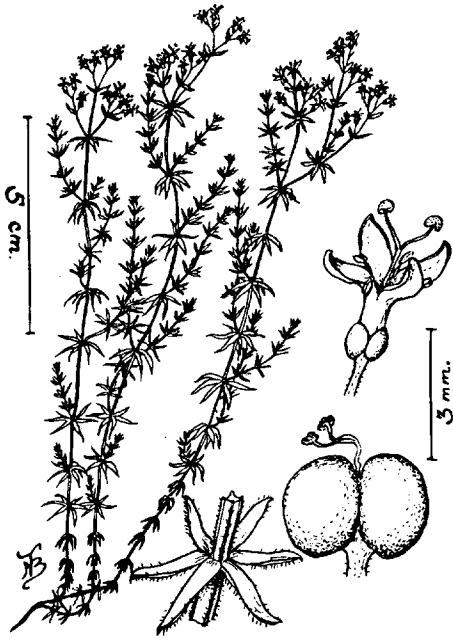
2. Perennial herb of erect habit, stems rigid, minutely scabrid-pubescent between and (to lesser extent) on the angles; *leaves more or less appressed, in whorls of 4, pairs unequal but joined at base in short sheath, linear with broad midrib filling most of undersurface between recurved margins*, glabrous above but more or less scabrid on margins and beside midrib of undersurface; *apices obtuse but with apical tuft of scabrid hairs*; flowers few in terminal



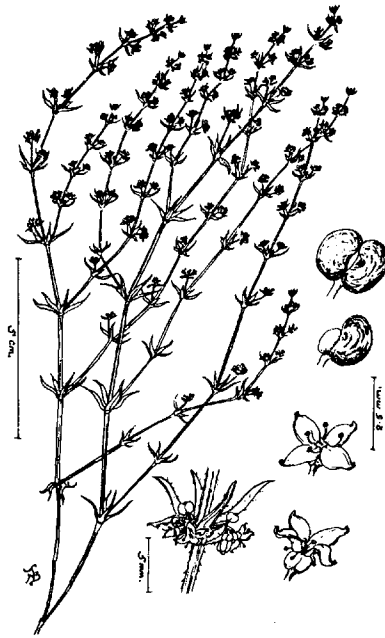
340. *Pomax umbellata*



341. *Opercularia hispida*



342. *Asperula conferta*



343. *Galium gaudichaudii*

clusters. Among boulders along Murrumbidgee River; south-eastern Queensland, south-eastern New South Wales, and east Gippsland, Victoria.

1. *A. ambleia* Shaw et Turrill

2a. Perennial rhizomatous herbs with decumbent or ascendent stems; midrib prominent and keeled when dry, glabrous or scabrid-hispid; *leaves mostly 6 per whorl, acuminate or acute and with an acicular mucro.*

3. Branches commonly forming a loose mat; stems scabrid-pubescent especially on the angles, internodes on vegetative shoots short (less than 5 mm. long) but to 5 cm. long on flowering shoots; leaves linear with slender *acuminate apices with straight hyaline mucros, glabrous apart from rigid (sometimes scanty) marginal cilia*; flowers terminal or in uppermost axils, forming small clusters, solitary or in small cymes on short peduncles; fruit of 2 dry but drupaceous mericarps (sometimes only one maturing), white tinged with pink. A common species of the ground flora especially in wetter sites of dry sclerophyll habitats at higher elevations in the A.C.T.; also New South Wales, Victoria, and Tasmania. 'Prickly Woodruff'.

2. *A. scoparia* J. D. Hook.

3a. Perennial herb similar to preceding but of looser habit or more or less tufted; stems almost glabrous or scabrid-hispid on angles; leaves linear, 2-7 mm. long, *acute or shortly acuminate but apex with its hyaline mucro commonly recurved, glabrous apart from rigid cilia of margins and along midrib of undersurface*; flowers and fruits similar to those of preceding. Common and widespread species of damp or shaded sites from the woodland habitats below 2000 ft to subalpine habitats of high mountain ridges in the A.C.T.; from Queensland to Tasmania and South Australia. 'Common Woodruff'. Fig. 342.

3. *A. conferta* J. D. Hook.

1a. *Midrib not thickened or prominent on undersurface*, often obscure in upper third; leaves obtuse or shortly acute but *without hyaline mucro*; leaves in 4s or 6s.

4. Perennial herb with ascendent or decumbent stems from slender rhizomes; *stems glabrous or hispid to scabrid on the angles*; leaves linear-oblong to oblanceolate, 2-6 mm. long, obtuse or subacute, *scabrid pubescent on upper surface*, more or less ciliate on recurved margins, glabrous below; flowers similar to those of preceding, peduncles more than $\frac{1}{2}$ as long as leaves; corolla white or pinkish. In the A.C.T. this is found near granite boulders and outcrops in snow grass communities at high elevations; also New South Wales, Victoria, and Tasmania. 'Alpine Woodruff'.

4. *A. pusilla* J. D. Hook.

4a. Perennial herb resembling the preceding but the *stems retrorsely scabrid on the angles*; leaves oblong-elliptical, acute or obtuse, *glabrous above and below but the recurved margins more or less scabrid to ciliate*; flowers on short peduncles. In the A.C.T. grows in swampy habitats at high elevations; also New South Wales, Victoria, and Tasmania.

5. *A. gunnii* J. D. Hook.

5. GALIUM L.

Note: The Australian species are now under revision. The following text is therefore subject to alteration.

1. Leaves on stem nodes mainly in 4s, interpetiolar pair commonly more or less reduced or absent on the upper flowering nodes.

2. *Diffuse decumbent or ascendent annual herb* with filiform glabrous stems; leaves in 4s or only 2 at upper nodes, linear elliptical to oblanceolate or obovate, 2-6 mm. long, thin, acute and mucronate, subglabrous above, sparsely scabrid on margins; *flowers solitary in axils (i.e. 2 per node), usually reflexed; in fruit the slender mericarps oblong-cylindrical, about 1.25 mm. long, one with more hooked hairs than the other.* In the A.C.T. occurs in damp

shaded sites in disturbed woodland or forest habitats; of Mediterranean origin, naturalised in New South Wales, Victoria, and South Australia. 'Small Bedstraw'.

1. **G. murale* (L.) All.

2a. Perennial, stems not filiform; flowers in axillary clusters or cymes or panicles.

3. *Stems more or less tufted from perennial rootstock, rarely more than 30 cm. long, quadrangular, more or less sparsely but retrorsely scabrid-asperulous on the angles; leaves subsessile in 4s but the interpetiolar pair commonly smaller on upper nodes, linear with revolute margins concealing lower surface or less often ovate-elliptical and almost flat on lower nodes, sessile and not greatly narrowed at base, 4-6 mm. long or smaller at upper nodes, sparsely scabrid; flower clusters axillary, on shoots usually shorter than subtending leaves and bearing 1-2 pairs of leaves below shortly pedicellate flowers; corolla white; fruit of 2 reniform mericarps 1-1.5 mm. long, glabrous, subfleshy and slightly wrinkled (when dry). In the A.C.T. a common species in dry sclerophyll habitats; south-eastern Australia and Tasmania. Fig. 343.*

2. *G. gaudichaudii* DC.

3a. *Stems long and diffuse from creeping rhizomes, copiously hirsute with spreading hairs from the angles; leaves in 4s but the interpetiolar pair much reduced or absent from uppermost nodes, 6-15 mm. long, lanceolate-elliptical or ovate, narrowed into short hirsute petiole, apices subcallose and acute-apiculate, often up-curved, upper surface and recurved or revolute margins hirsute with spreading hairs, lower surface less hirsute except on midrib; flowers minute, creamy white or yellow, pedicels 1-5 mm. long in diffuse pedunculate cymes terminal to stems or in upper axils and the uppermost much longer than subtending leaves (upper 20-30 cm. of stem may form diffuse cymose panicle); fruit of reniform glabrous mericarps 1.5-2 mm. long wrinkled when dry. In shaded damp sites on river or creek banks or under shrubs in forest habitats.*

3. *G. ciliare* J. D. Hook.

1a. Leaves on stem nodes mainly in 6s and of equal length; introduced annuals.

4. *Robust straggling herb with coarse quadrangular stems, angles prominent and sparsely retrorsely scabrid; leaves varying from obovate at lowest nodes to narrowly oblanceolate at upper, 1.5 cm. long (lowest) to 6 cm. long (mid stem), very slender in lower third but not petiolate, sparsely hispid above but with retrorse teeth-like hairs on recurved margins and midrib of lower surface, apices abruptly narrowed into slender apiculum up to 1.5 mm. long; flowers pedicellate in paniculate cymes on axillary shoots or terminal, sometimes reduced to a single flower; fruit of globose-reniform mericarps 3-4 mm. long and covered with hooked hairs. Of European origin, an uncommon weed in the A.C.T. (Canberra area) but widely naturalised in temperate Australia. 'Cleavers'.*

4. **G. aparine* L.

4a. *Slender diffuse herb commonly less than 30 cm. high, stems glabrous except for minute scabridity on the angles; leaves linear or linear-elliptical, 5-10 mm. long, sessile, acute or acuminate, with or without hyaline apiculum or mucro; lateral branches and upper part of plant forming a very diffuse cymose panicle with long filiform peduncles bearing terminal pedicellate flowers, nodes 4- or 2-leaved; fruit of rugose reniform mericarps about 0.5 mm. long. Not uncommon weed of roadsides and disturbed but shaded habitats in the A.C.T.; native to Europe and the Mediterranean, recorded as naturalised in South Australia and New South Wales.*

5. **G. divaricatum* Lam.

6. *SHERARDIA* L.

Ascendent annual herb to 20 cm. high, stem angular and glabrous; leaves mostly 6 per node (4 at lowest nodes), elliptical or the lowest obovate, acuminate, mucronate, 5-15 mm.

long, sparsely hispid on upper surface, ciliate on nerve-like margins and on midrib beneath; flowers in terminal clusters in an involucre of the uppermost leaves which are united at their bases; calyx minute and 6-toothed; corolla pink or mauve, lobes spreading but shorter than tube; fruit crowned by persistent calyx teeth and crowded in the involucre. An occasional weed of gardens, road-sides and other disturbed areas; native to Europe and western Asia, naturalised in New South Wales, Victoria, and South Australia. 'Field Madder'. Fig. 344.

**S. arvensis* L.

CAPRIFOLIACEAE

SAMBUCUS L.

1. Herbaceous subshrub or perennial herb to 1.5 metres high; sparsely scabrid on upper parts and leaves; *stipules well-developed, leafy, ovate, serrate or subentire*, reflexed or spreading; leaves pinnate, the lower pinnae of larger leaves again compound with basal pinnules, uppermost sometimes decurrent; pinnae ovate-lanceolate to elliptical, 8-15 cm. long, acuminate, coarsely serrate; flowers sessile in terminal cymes or cymose panicles; calyx lobes 3-4, ovate, obtuse, less than 1 mm. long; petals creamy-white; concave, 2 mm. long, very shortly united or almost free; anthers apiculate, filaments short, falling with petals; ovary inferior, 3-4-celled; fruit at first angular but swelling into a globular *white or translucent berry* 6-7 mm. diameter. In damp shaded gullies with tree ferns, in wet sclerophyll forest in the Cotter Valley; from Queensland to Tasmania and South Australia. The berries are edible. 'White Elder'. Fig. 345.

1. *S. gaudichaudiana* DC.

1a. *Bushy shrub or small tree to 3 metres high*, glabrous throughout or sparsely scabrid on nerves of undersurfaces of leaves; leaves pinnate, *stipules absent or very small and subulate*; pinnae 5-7, broadly ovate to broadly oblong-lanceolate, 5-8 cm. long, entire at base but closely serrate above, with narrow apiculum; flowers sessile or pedicellate in broad cymose panicles; calyx lobes 5, ovate, obtuse, nearly as long as inferior ovary; petals 5, white, broadly oblong above short tube, about 2.5 mm. long, spreading; anthers not apiculate, the cells back to back, filaments as long as or slightly longer than cells; fruit a globular berry 7-8 mm. diameter, *black when ripe*. An old garden plant sometimes persisting around old settlements or more or less naturalised in gullies near some creeks; native to temperate parts of the Old World. 'Common' or 'Black Elder'.

2. **S. nigra* L.

CUCURBITACEAE

1. Tendrils simple; fruit less than 3 cm. diameter, covered with soft bristles, flesh pulpy.

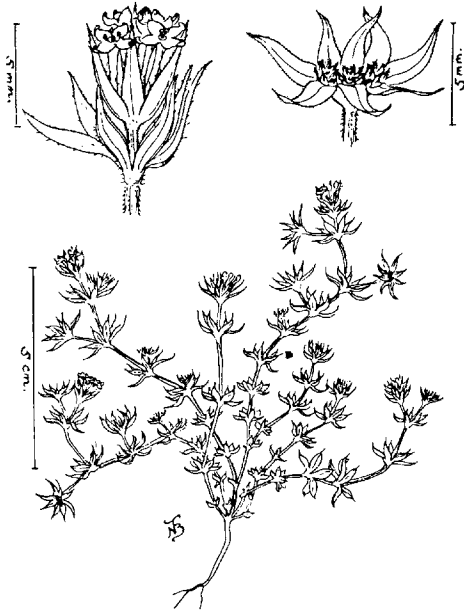
1. *Cucumis*

1a. Tendrils branched; fruit more than 3 cm. diameter, smooth, flesh white and firm.

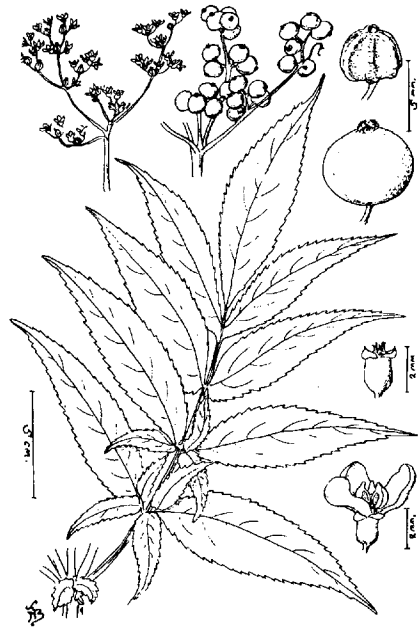
2. *Citrullus*

1. CUCUMIS L.

Prostrate annual with scabrid stems; leaves deeply palmatifid, segments often lobed, lobes obtuse, margins undulate, scabrid with tubercle-based bristle-hairs sparse on upper surface but dense beneath; petioles scabrid; tendrils simple; flowers unisexual; males in small axillary clusters, pedicellate, connective of the anthers produced in a small appendage; female flowers solitary or paired, ovary covered with bristles which persist on the globose or ellipsoidal fruits 2-2.5 cm. in diameter, the surface mottled green and yellow; flesh greenish, pulpy around pale yellow seeds (3.5-4 mm. long). Native to eastern Africa but widely



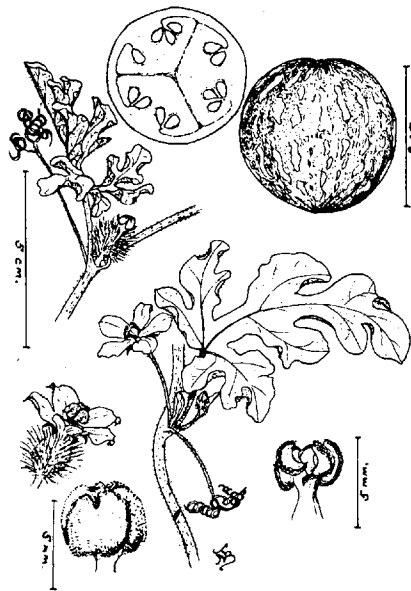
344. *Sherardia arvensis*



345. *Sambucus gaudichaudiana*



346. *Cucumis myriocarpus*



347. *Citrullus lanatus*

naturalised in Australia; in the A.C.T. mostly found on sandy alluvium along creeks and rivers but sometimes on waste or cultivated ground. 'Prickly Paddy Melon'. Fig. 346.

**C. myriocarpus* Naud.

2. **CITRULLUS** Schrad. ex Eckl. et Zeyh.

Prostrate annual with scabrid stems; leaves ovate-cordate in outline, 6-15 cm. long, deeply lobed, lateral lobes asymmetrically lobed, central part lobed above; petiole and lower surface very scabrid with tubercle-based bristle-hairs; upper surface scabrid with shorter hairs; tendrils bifid or trifid; flowers unisexual; males on villous peduncles, anthers sinuous, lacking appendage; females with both peduncle and inferior ovary softly villous; fruit glabrous, globose, mottled with irregular white blotches at least when young, 10-15 cm. diameter, flesh white and firm, bitter to taste, seeds brown, about 10 mm. long. The wild form of the cultivated Water Melon which has been called *C. vulgaris* Schrad. ex Eckl. et Zeyh. Plants occur in alluvial areas along main creeks and rivers. The seeds are eaten by parrots and the flesh of broken fruit by stock. Native to South Africa but widely naturalised in many parts of Australia. 'Bitter Melon', 'Pie Melon'. Fig. 347.

**C. lanatus* (Thunb.) Matsumura et Nakai

CAMPANULACEAE

1. Flowers in terminal racemes; corolla deep blue; fruit a capsule with minute seeds; plants erect or ascendent.

1. **Lobelia**

1a. Flowers solitary, terminal or axillary.

2. Corolla irregular, white or pale blue; anthers coherent around the style; plants prostrate.

3. Corolla tube split on one side; fruit indehiscent and sub-succulent; flowers unisexual, on different plants.

2. **Pratia**

3a. Corolla tube not split on one side; fruit a capsule; flowers bisexual (in A.C.T. plants).

3. **Isotoma**

2a. Corolla regular, bright blue within; fruit a capsule with minute seeds; plants erect or ascendent.

4. **Wahlenbergia**

1. **LOBELIA** L.

1. Erect glabrous annual to 25 cm. high, stems simple or paired; leaves elliptical or lanceolate with distant teeth but spirally twisting when dry and appearing entire, 2-3 cm. long; racemes terminal, secund, simple or once branched, flowers pedicellate, bracts small, linear, scattered; calyx tube soon gibbous and obliquely globose, lobes 2 mm. long; corolla about 10 mm. long; upper lobes erectly falcate, more or less conduplicate above but pilose within; lower lip deflexed, pilose in throat, 3-lobed, lobes oblanceolate, obtuse, apiculate, lateral lobes falcate and spreading, central lobe slightly longer, broader and more obtuse; anthers densely ciliate at apices, filaments sometimes sparsely ciliate below; capsule 3-4 mm. long, seeds minute (less than 0.25 mm. long). Lower slopes of Mt Ainslie; widespread in eastern Australia from Queensland south to Tasmania. Fig. 348C (flower).

1. **L. gibbosa** Labill. var. **browniana**
(Roem. et Schult.) F. M. Bail.

1a. Differing from above in more robust habit; corolla more than 15 mm. long, upper lobe with conspicuous saccate protuberance near upper margin, lower lip not deflexed; seeds 0.5-0.75 mm. long, trigonous.

2. Stems simple, leaves linear, entire or lower ones with few teeth; raceme terminal, secund,

simple (rarely forked); bracts often more or less paired or with one on rhachis and another on the pedicel; calyx tube obovoid or subglobose, lobes 3 mm. long; *corolla 15-20 mm. long*, upper lobes recurved-falcate, conduplicate above, *with or without pilose hairs on midrib of outer surface*; lower lip spreading, pilose in throat or at base of the 3 lobes, lateral lobes falcate, linear-oblong, obliquely obtuse or acute, central lobe scarcely $1\frac{1}{2}$ times as long, *elliptical*, obtuse to acute; anthers densely ciliate, filaments sometimes sparsely ciliate; capsule 6-8 mm. long. In forest areas of mountain slopes, generally at higher levels from 3000 ft upwards. Fig. 348B (flower).

2. *L. gibbosa* Labill. var. *gibbosa*

2a. *Stems often several from the butt, commonly branched; leaves elliptical or oblanceolate, toothed*; racemes simple or sparsely paniculate, bracts as in preceding; calyx tube gibbous-globose or obliquely obovoid (the two shapes shown in Fig. 348A), lobes 3-4 mm. long; corolla 18-22 mm. long, upper lobes as in preceding; lower lip with central lobe linear to oblanceolate, $1\frac{1}{2}$ times as long as falcate laterals; capsule 7-10 mm. long. In wet sclerophyll forest on higher mountain slopes. This form seems closest to *L. gibbosa* though differing in branched habit and the shape of the central lobe of the lower corolla lip. *L. gibbosa* is reported as having 'minute' seeds (0.2-0.3 mm.). This is the case in our representatives of var. *browniana* but in other local specimens and in both Tasmanian and mainland specimens of *L. gibbosa* the seeds are at least 0.5 mm. Fig. 348A (plant and flower).

3. *L. gibbosa* Labill. var. ?

2. *PRATIA* Gaudich.

Rhizomatous dioecious perennial herb, stems prostrate; leaves distichous, alternate, broadly orbicular-ovate to oval or broadly lanceolate, 5-12 (rarely to 15) mm. long, asymmetrical and obtuse or subcordate at base, apex obtuse, margins with shallow teeth or lobes; flowers solitary, male and female on different plants, axillary, pedunculate; *males* with obconical base shorter than calyx lobes which are narrowly triangular and glabrous or ciliolate; corolla 6-7 mm. long, tube pale, split almost to base on upper side, lobes white or white with dark central line or bluish-mauve; stamens connivent around style, anthers purplish, curved-asymmetrical, lower each with slender projecting bristle with shorter ones below; style with apical ring of hairs; *females* with corolla as in males but inferior ovary asymmetrically ovoid and longer than calyx lobes, sterile anthers pale; style with bifid papillose stigma; fruit fleshy, green or yellowish, puberulous or glabrous, sepals and base of corolla persistent but capsule not protrudent. There appear to be two forms but neither the degree of puberulence nor the length of the peduncles are reliable as diagnostic features. They probably include the forms described as *Lobelia pedunculata* R.Br. (1810) and *Pratia puberula* Benth. (1896). In the former the branches are elongated with internodes commonly more than 5 mm. long, peduncles of male flowers soon longer than the leaves (to 3.5 cm. long), capsule 8-10 mm. long, 4-5 cm. diameter. In the latter the branches are short, leaves crowded, peduncles of male and female flowers to 2 cm. long (often $1\frac{1}{2}$ times as long as leaves or shorter), capsule about 5 × 5 mm. (see Fig. 349). Found in swampy places or damp ground especially at intermediate to high elevations or in swamps of cold valleys. Also found in New South Wales, Victoria, South Australia, and Tasmania.

P. pedunculata (R.Br.) Benth. sens.
lat.

3. *ISOTOMA* Lindl.

Small prostrate glabrous or almost glabrous perennial herb, rhizomatous, stems prostrate; leaves alternate, oblong-obovate to broadly oval, 5-12 mm. long, 2-8 mm. wide, obtuse or rounded at apex, narrowed to very short petiole, margins subentire or with shallow teeth; flowers on slender peduncles from upper axils; calyx lobes narrow triangular, shorter than inferior ovary; corolla tube pale and slender, about 5 mm. long, lobes elliptical, pale blue on

inner face; lower lip with dark-bordered pale patch at base, lobes with dark-tipped scattered hairs; stamens fused around style, connivent anthers asymmetrically clavate, lower 2 anthers each with an apical bristle above tuft of shorter bristles; style emerging, stigma bilobed; fruit slightly asymmetrical, summit nearly as long as calyx lobes. Common in wet sites near creeks or on swampy ground especially at lower to mid elevations; also New South Wales to Tasmania and south-eastern South Australia. Fig. 350.

I. fluviatilis (R.Br.) F. Muell. ex Benth.

Note: *I. axillaris* Lindl. has been collected in the Taemas area north-west of the A.C.T. It is a straggling pubescent herb with narrowly lobed pinnatifid leaves, corolla tube 2.5 cm. long with the oblanceolate lobes deeper blue within and glabrous.

4. **WAHLENBERGIA** Schrad. ex Roth See *Carolin* (1964a)

1. Small annual less than 20 cm. high (often less than 10 cm.); stems simple or few-branched, lower part and stem leaves hispid with spreading bristle-hairs, upper parts more or less glabrous; leaves alternate or basal ones clustered (but withering early and sometimes not seen), oblong to elliptical, obtuse or acute, 3-15 mm. long, margins nerved-like and often undulate; flowers terminal, few per plant; sepals 1-2 mm. long, as long as or slightly longer than *globose or subglobose ovary which is commonly hispid but may be glabrous*; corolla tube narrow, as long as calyx, lobes shorter than tube, spreading to 3-4 mm. diameter, pale blue within; capsule globose to obovoid, about twice as long as sepals when mature. Easily overlooked owing to its small size but has been collected on Black Mountain and near Queanbeyan; widespread in New South Wales, Victoria, Tasmania, and South Australia.

1. *W. gracilentia* Lothian

1a. Perennial or short-lived herbs usually more than 20 cm. high or with larger flowers or with narrow linear stem leaves; ovary obovoid or obconical; corolla more than twice as long as sepals.

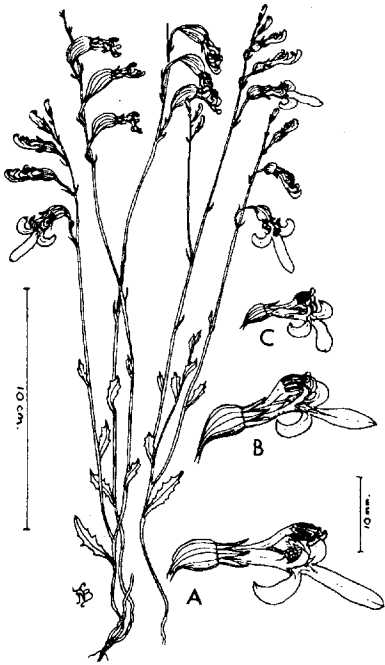
2. Upper parts of style with 2 or 3 series of glandular swellings (6 or more).

3. Upper part of style slender, commonly longer than thinner basal part.

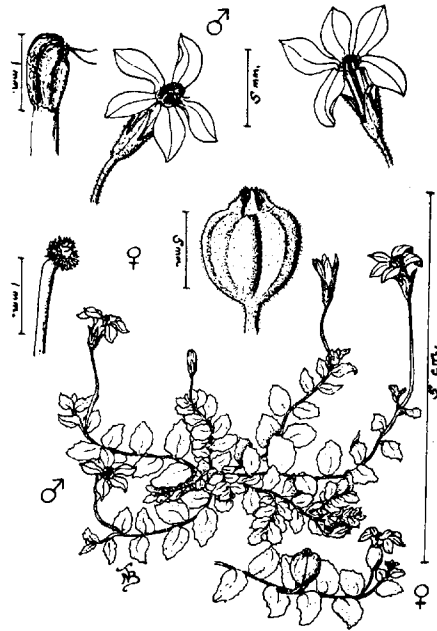
4. Stems few or several, hispid, to 60 cm. high; *leaves opposite* (or uppermost subopposite) oblong to lanceolate or upper ones narrow elliptical, 1.5-5 cm. long, *more or less hispid especially on midrib of lower surface and on margins, the bristle-hairs decurrent on stem*, margins often undulate, not nerved-like; upper stems bare, cymosely branched, branches subtended by narrow bracts; flowers on long peduncles; calyx and ovary glabrous or hispid; sepals 5-12 mm. long, 2-3 times as long as obconical ovary unless short; corolla tube 5-9 (usually 7-9) mm. long, obconical to narrow campanulate, lobes blue within, pale outside, glabrous or with few hairs along midrib of outer face, oblong-lanceolate, less often elliptical, acute, *spreading 2-3 cm. diameter*, 1-1½ times as long as tube; style with short base, the upper part scarcely thicker but with 3 series of glandular swellings, uppermost immediately below the 3 stigmas; capsule as long as sepals, slender obovoid to obconical, commonly slightly constricted at summit. Common species from wooded or open forest habitats at lower altitudes (e.g. Hall, Black Mountain, Majura Lane) to upper mountain slopes (at Mt Coree, Mt Franklin, and on Snowy Flats, Mt Gingera); also widespread in southern and eastern Australia, Tasmania, New Zealand. Fig. 351.

2. *W. stricta* Sweet

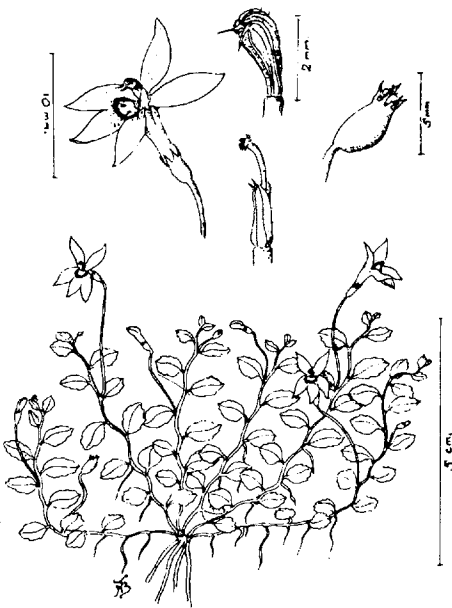
4a. *Stems often numerous* (except in undersized plants), to 50 cm. high, glabrous or sparsely hispid towards base; *leaves alternate or lowest sub-opposite, narrow linear to narrow lanceolate*, 1-7 cm. long, 1-3 mm. wide, glabrous or sparsely hispid on margins and midrib of under-surface, margins not thickened, sometimes with distant callous teeth, leaves often lost



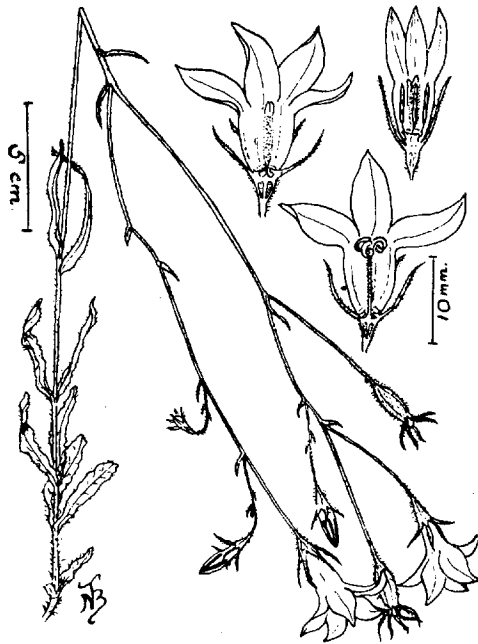
348. *Lobelia gibbosa*



349. *Pratia pedunculata*



350. *Isotoma fluviatilis*



351. *Wahlenbergia stricta*

from plants in late flowering condition; stems cymosely branched above leaves, with narrow bracts; flowers on long slender peduncles; ovary 3 mm. long, narrow obconical, glabrous; sepals 3-5 mm. long (smaller in late flowers), corolla tube narrowly funnel-shaped, 5-6 mm. long, lobes bright blue on inner face, obovate, 6-9 mm. long, acute (smaller in late flowers); style similar to that of preceding species; capsule narrow obconical, 6-9 mm. long. A variable species with widespread distribution from northern Queensland to southern Australia, also in New Guinea. In the A.C.T. it is common at lower altitudes especially in woodland or grassy places. In open sites it is often many-stemmed and may persist in this form in gardens.

3. *W. communis* Carolin

3a. Few-stemmed herb to 60 cm. high, *leaves clustered near base or alternate on lower 7-9 cm. of stems, hirsute-hispid* especially on midrib of undersurfaces of leaves; lowest leaves more or less clustered in rosette, obovate, obtuse, with narrow base, 1-4 cm. long, intermediate leaves lanceolate to elliptical, sessile; uppermost leaves linear, 1-5 cm. long; *margins undulate, thickened and nervalike, with distant minute calli projecting on upper side of margin*; upper stems glabrous, cymosely branched, flowers on long slender peduncles; ovary 3-4 mm. long and almost as wide; sepals 4-5 mm. long; corolla tube broadly campanulate, 3.5-4.5 mm. long (commonly shorter than sepals); lobes blue within, elliptical to obovate, 9-14 mm. long; *upper half or less of style thickened with prominent glands in 2-3 series, stigmas usually 3*; capsule shortly obconical, 4-7 mm. long. New South Wales, Central Tablelands and Western Slopes from the Blue Mountains to the A.C.T. where it has been collected at Kowen, Mt Ainslie, Black Mountain, and Hall.

4. *W. graniticola* Carolin

2a. Upper part of style with few glandular swellings (commonly 4 or less) which if placed high may be hidden by recurved stigmas; corollas broadly campanulate.

5. *Plants highly variable in size (from a single stem less than 10 cm. high bearing single flower less than 8 mm. diameter to branched ascending stems to 60 cm. and flowers to about 2 cm. diameter)*; stems glabrous or almost so; *leaves alternate or lowest 1-2 pairs more or less opposite*; lowest leaves oblanceolate, up to 2 cm. long, hispid (especially on midrib of lower surface), *margins undulate and nervalike with raised callosities as in W. graniticola*; upper leaves elliptical or linear, 0.5-6 cm. long, 1-3 mm. wide, margins nervalike, flat or undulate; uppermost leaves glabrous; stems simple above leaves or cymosely branched; flowers on long peduncles; ovary 1.5-2 mm. long (small flowers) or up to 3 mm. (larger flowers), sepals 1-2 mm. or 3-4 mm. long; *corolla tube shorter than calyx* (1 mm. or 1.5-2.5 mm.); lobes 2-3 mm. or 3.5-5 mm. long bright to deep sky-blue within, pale outside; style slender, upper part short and not much thickened, with about 3 glands immediately below the 3 broad stigmas; capsule obovoid, 4-8 mm. long, 3-6 mm. diameter, valves very short. A complex group widespread throughout temperate southern and eastern Australia and Tasmania; in the A.C.T. it is found in woodland and dry forest habitats, e.g. near Canberra, Hall, Mt Tennent, and Boboyan. Plants may also persist in gardens.

5. *W. multicaulis-tadgelii* complex

5a. Corolla spreading to more than 2 cm. diameter.

6. Stems often simple, to 60 cm. high from branched rhizome, with single terminal flowers or with one from a lateral peduncle as well; glabrous throughout or decurrently hispid on lower parts; *leaves alternate, lanceolate, oblong or oblanceolate, obtuse, midrib prominent and sometimes hispid on lower surface; margin not thickened and nervalike, usually flat, sometimes more or less undulate though less so than in W. gloriosa*; flowers on long peduncles, commonly nodding; sepals 4-6 mm. long; *corolla tube slightly longer than sepals*, 6-8 mm. long, *lobes elliptical, acuminate, sky-blue on inner face*, 14-20 mm. long; style with few scattered glands on upper part which is longer than base and broadened upwards to the

stigmas (*usually 3*); capsule 6-8 mm. long, obovoid, 5-6 mm. diameter. Found in swamps at high elevations, sometimes growing in sphagnum hummocks, also south-eastern New South Wales, Victoria, and Tasmania.

6. *W. ceracea* Lothian

6a. Stems simple from branched rhizome or branched above the short leafy basal portion, glabrous or more or less decurrently hispid below leaf bases; *leaves often opposite*, from obovate or oblanceolate to oblong, 1-2.5 cm. long, midrib of undersurface sparsely hispid or glabrous, *margins conspicuously undulate above narrow base, the recurved parts separated by minute erect callosities*, margin of base more or less hispid; leafless upper part making at least $\frac{3}{4}$ of the plant height; flowers on long slender peduncles with few distant narrow bracts, erect or (not often) half nodding; ovary 3-5 mm. long, obconical; sepals 5-7 mm. long; corolla tube 4-6 mm. long, *shorter than or equal to sepals, lobes obovate to oblanceolate, acute*, from deep sky-blue to cobalt inside, 12-18 mm. long; style with 2-4 glandular swellings on the upper part, *stigmas commonly 2* (less often 3); capsule obconical, 12-15 mm. long, 5-6 mm. diameter. Common above 4000 ft, a showy species of subalpine and high montane forest and woodland, the unusually deep blue of the flowers makes it particularly attractive; also in south-eastern New South Wales and Victoria.

7. *W. gloriosa* Lothian

GOODENIACEAE

1. Calyx lobes free to base; ovary superior.

1. *Velleia*

1a. Calyx lobes not free to base, attached to the partially inferior ovary.

2. *Goodenia*

1. *VELLEIA* J. E. Sm. *See Carolin (1967a)*

1. Small perennial herb; leaves in radical tuft, oblanceolate to oblong-spathulate, narrowed to slender base, 2-8 cm. long, obtuse, glabrous or ciliate only on entire margin; *peduncles usually shorter than leaves*, a pair of narrow opposite bracts subtending the few flowers, bracts glabrous or ciliate; pedicels and sepals hairy; *calyx 3-5 mm. long, sepals 3*, ovate or broadly lanceolate, slightly larger in fruit; *corolla pale yellow*, up to twice as long as sepals, lobes hairy outside; capsule shorter than sepals; seeds disc-shaped, pale with thick margin. In subalpine mountain swamps at high elevations and in cold mountain valleys; New South Wales (Barrington Tops) to Victoria and Tasmania.

1. *V. montana* J. D. Hook.

1a. Loosely tufted perennial herb; radical leaves oblanceolate to spathulate with slender base often as long as blade, 6-15 cm. long, margins subentire, crenate or toothed, also ciliate, midrib hairy on undersurface; *peduncles more than twice as long as leaves*, hirsute, pedicels subtended by paired leafy bracts 1-2 cm. long; *sepals 5, 8-12 mm. long*, oblong lanceolate, acute or acuminate, inner slightly larger than outer; *corolla bright yellow or orange*, about $1\frac{1}{2}$ times as long as sepals, lobes hairy on outside and darker than wings of upper margins, a slender spur projecting between lower sepals at base; capsule shorter than or as long as sepals; seeds disc-shaped with well-developed pale margin. In dry sclerophyll and grassland habitats at lower elevations (flowering November, sepals acuminate) and also in subalpine woodland or forest at high elevations (flowering January-February, sepals acute or shortly acuminate). South-eastern Queensland to Tasmania and South Australia. Fig. 352.

2. *V. paradoxa* R.Br.

2. *GOODENIA* J. E. Sm.

1. Perennial herb; *leaves in radical tuft, pinnatifid or crenate, glabrous or sparsely hairy*,

2-7 cm. long; peduncles much longer than leaves, with 1-4 flowers on long pedicels; bracts leafy, lobed or entire, erect, glabrous or almost so; calyx 7-8 mm. long, lobes free for about $\frac{1}{3}$ to $\frac{1}{2}$ their length, usually glabrous (local plants); corolla 2-2.5 cm. long, bright yellow, 3 lower petals joined for $\frac{1}{2}$ their length, broadly winged above, wings ciliate or glabrous, upper petals free almost to base, asymmetrically winged, recurved, with hollow ciliate auricle which covers the indusium; anthers apiculate; indusium sparsely hairy, the rim densely ciliate; capsule 6-8 mm. long, slightly compressed, orbicular to ovoid; seeds flat, black with pale margin. Common summer herb of woodland and open sites near Canberra, persistent on disturbed areas near settlements, the leaves often withering before flowering is completed; also widespread throughout temperate Australia. 'Scrambled Eggs'. Fig. 353.

1. *G. pinnatifida* Schlecht.

1a. Perennial herbs with or without radical leaf-tuft but with ascendent or prostrate branches. Corolla pale yellow, less than 2 cm. long.

2. Usually with both radical leaves and ascendent or trailing branches to 25 cm. long; stems thinly tomentose when young; radical leaves spatulate or oblong-lanceolate, 4-9 cm. long, petioles almost as long as blades, shortly tomentose below when young, margins subentire or toothed or almost lobed; stem leaves smaller on shorter petioles, oblong-elliptical or narrow lanceolate, 1-3 cm. long, obtuse or acute, margins serrate or irregularly toothed; flowers 1-3 on slender peduncles longer than leaves, pair of subulate or linear bracteoles distant from flower; calyx shortly tomentose, 6-8 mm. long, lobes lanceolate-subulate, about as long as fused portion; corolla 1-1.5 cm. long, shortly tomentose outside; lower petals with undulate wings in upper part; upper petals recurved, asymmetrically winged, with hairy auricle on upper margin; capsule flattened-globose to oblong; seeds pale, minutely papillose, margin thickened. Common in woodland areas and dry forest habitats of mountain slopes especially at lower elevations; also south-eastern Queensland to north-eastern Victoria.

2a. *G. hederacea* J. E. Sm.

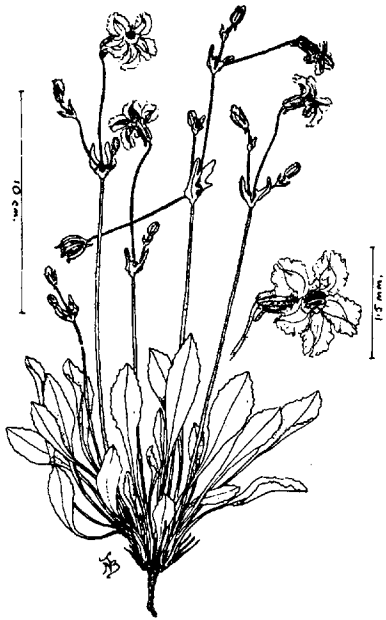
2a. Stems prostrate, matted, to 1 metre diameter; radical leaves only present on young plants; stems tomentose with erect leaves on slender petioles as long as or longer than the orbicular, broadly ovate or broadly obovate blades 1.5-3 cm. long and almost as wide, margins crenate or serrate and sometimes lobed at base; flowers solitary (rarely 2 on a peduncle), a pair of subulate bracts on upper half of slender peduncle; calyx 6-7 mm. long, tomentose (especially between the lobes); corolla about 1 cm. long, tomentose outside, similar to that of preceding species but the auricles not hairy within; indusium almost glabrous but usually with short pubescence near base, margin densely ciliate; capsule obovoid or fusiform, 6-7 mm. long; seeds as in preceding but smaller. The amount of tomentum developed varies with age and with habitat, young plants or those from colder sites usually more tomentose than older ones or those from sheltered forest habitats. A very common species of higher elevations, not highly floriferous but bearing flowers over a long period of months; also Australian and Victorian Alps.

2b. *G. hederacea* J. E. Sm. var. *alpestris* Krause

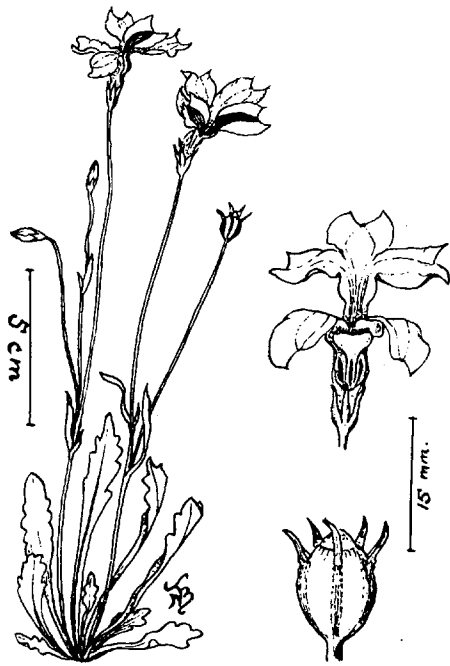
STYLIDIACEAE

STYLIDIUM Swartz ex Willd.

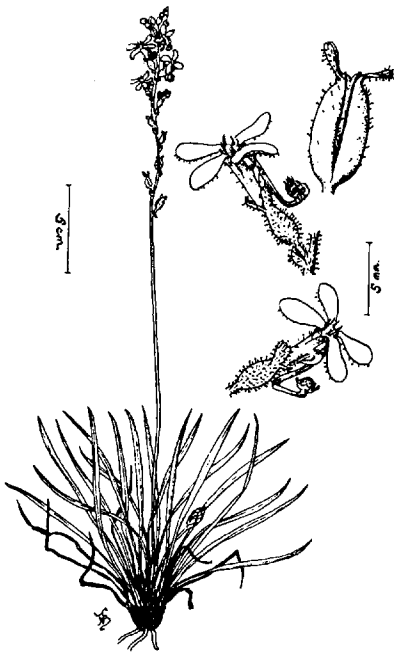
1. Perennial herb with dense tuft of radical leaves; leaves linear or elliptical, often reddish below, 5-25 cm. long, 2-6 mm. wide, margins entire or scabrid-denticulate; inflorescence erect, 20-70 cm. high, rhachis glandular-hairy above; flowers shortly pedicellate, bracts ovate, bracteoles minute, both glandular-hairy like calyces; calyx tube about as long as lobes but soon lengthening; sepals in opposed 2- and 3-lobed lips 2-3 mm. long; corolla pink to deep pink, tube short; labellum (anterior petal) short, ovate, reflexed with pair of appendages at base; other petals in opposed pairs, 3-4 mm. long, spreading, with erect



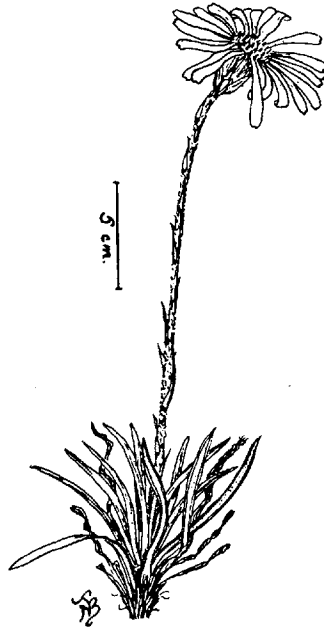
352. *Velleia paradoxa*



353. *Goodenia pinnatifida*



354. *Stylidium graminifolium*



355. *Celmisia longifolia*

appendages at their bases; gynostemium ('trigger') reddish, longer than petals, recurved over labellum, against tube when in poised position, ending in a broad cushion whose surface is at first covered by divergent cells of 2 sessile anthers which later wither and are pushed aside by developing stigma, appendages present on back; ovary 2-celled, fruit turgid but grooved laterally, splitting septically; seeds reddish-brown, angular. Pollinated by small bees. A common summer-flowering species in forest habitats at all elevations from below 2000 ft to above 5000 ft. 'Trigger Plant'. Fig. 354.

1. *S. graminifolium* Swartz ex Willd.

1a. *Small annual rarely more than 5 cm. high; leaves alternate, lanceolate and bract-like, 2-4 mm. long; flowers few, in a short cyme or solitary on simple stem; calyx with slender tube, lobes short and linear or the 2 opposite the labellum fused to middle or higher; corolla whitish or with pink markings, tube very short, labellum minute, ovate and reflexed, longer petals linear-oblong and obtuse, about 1 mm. long (about twice as long as calyx lobes), paired laterally, throat with conspicuous appendages; gynostemium flattened, about as long as petals, curved but not reflexed against tube; capsule linear; seeds light brown. In swampy ground at low elevations, in similar sites to Utricularia dichotoma.*

2. *S. aff. inundatum* R.Br.

COMPOSITAE (ASTERACEAE)

Note: Some authors use the term 'cypsela' for the fruit of Compositae because it is not a true achene. The more common practice has been followed here.

Key to Tribes Occurring in the A.C.T.

1. Florets either all tubular or with tubular florets in the centre and ligulate ones on outer rows of the head, or florets of outer rows without corollas.
2. Anthers acute or obtuse at the base; involucre bracts herbaceous, without scarious or coloured radiating tips and without spines (except *Xanthium*).
3. Anthers obtuse at the base.
4. Involucral bracts in 2 or more rows.
5. Corolla present on all florets; outer florets ligulate or all tubular; pappus of bristles, awns, scales or lacking.
6. Flowerheads terminal to main and lateral shoots or, if in panicles or corymbs, then the pappus of fine bristles; style branches with sterile hairy apices.

Astereae

- 6a. Flowerheads in panicles or corymbs; pappus lacking or reduced to minute cup; style branches truncate, more or less papillose at the apical margin.

Anthemideae

- 5a. Corolla minute or absent from outer (female) florets *or*, if these are ligulate, the leaves opposite *or*, if heads unisexual, female florets with involucre fused in a spiny burr.
7. Involucral bracts without scarious margins or fused in spiny burr; pappus of erect awns or scales or lacking.

Heliantheae

- 7a. Involucral bracts with scarious margins; pappus of acute scales or lacking.

Anthemideae

- 4a. Involucral bracts in one row; heads with florets all tubular or the outer row with bright yellow ligules; pappus fine and silky.

Senecioneae

- 3a. Anthers acute at base; style swollen below shortly bifid apex; leaves with close web of slightly sticky hairs on undersurfaces; outer florets conspicuous and ligulate.

Arctotideae

- 2a. Anthers tailed at base.
8. Involucral bracts subherbaceous or scarious and with or without radiating scarious or coloured apices; receptacle naked or with scales between the florets; heads sometimes arranged in dense compound heads with a common involucre.

Inuleae

- 8a. Involucral bracts with spines; receptacle with numerous fine straight hairs between the florets (except **Onopordum**).

Cynareae

- 1a. Florets all ligulate; plants with milky sap.

Cichorieae

Astereae

1. Pappus of fine bristles.
2. Leaves chiefly radical; flowerheads solitary and terminal.
3. Outer florets with conspicuous white ligules; leaves shining above, woolly tomentose underneath.
 1. **Celmisia** (p. 355)
3a. Outer florets with purple ligules not or scarcely longer than innermost involucral bracts; leaves hirsute on both surfaces with multicellular hairs.
 2. **Erigeron** (p. 355)
2a. Stems leafy, radical tuft usually absent.
4. Bushy perennial herbs, rarely more than 30 cm. high; ligulate florets blue, violet, or pink.
 3. **Vittadinia** (p. 356)
4a. Shrubs, undershrubs, or herbs with tall simple or paniculately branched stems.
5. Shrubs or undershrubs; ligulate florets conspicuous, white or blue.
 4. **Olearia** (p. 356)
5a. Tall annual or biennial herbs; ligulate florets very slender with minute ligules.
6. Heads more or less campanulate or cylindrical (when fresh); bracts in 2 series and strongly reflexed with age.
 5. **Conyza** (p. 360)
6a. Heads turbinate with narrow acute base; bracts in several rows, reflexed later but rarely strongly so.
 6. **Aster** (p. 361)
1a. Pappus of awns or minute bristles or lacking.
7. Pappus none or a tuft of minute bristles.
8. Disc florets all or mostly developing achenes; achenes sometimes winged, with or without pappus of minute bristles.
 7. **Brachycome** (p. 361)
8a. Disc florets sterile; achenes of fertile florets without pappus.

9. Achenes glandular, narrowed above in a short beak surmounted by a thickened collar; outer florets ligulate, white or violet.

8. **Lagenophora** (p. 365)

9a. Achenes obovoid, not glandular and without beak or collar; outer florets dark with minute tubular scarcely ligulate corollas.

9. **Solenogyne** (p. 365)

7a. Pappus of retrorsely hairy spines.

10. **Calotis** (p. 365)

Heliantheae

1. Leaves alternate; fruiting head a spiny ovoid burr.

11. **Xanthium** (p. 366)

1a. Leaves opposite; fruiting head not a spiny burr.

2. Involucral bracts wrapped around the thick angular achenes; pappus none.

12. **Sigesbeckia** (p. 366)

2a. Involucral bracts not wrapped closely around achenes.

3. Disc achenes flattened; pappus of 2-4 erect bristles or awns.

13. **Bidens** (p. 368)

3a. Disc achenes angular; pappus of plumose scales.

14. **Galinsoga** (p. 368)

Anthemideae

1. Perennial herbs with pinnatifid or doubly pinnatisect leaves. Heads in panicles or corymbs; pappus none. Introduced species.

2. Florets all tubular.

3. Heads in large leafy panicle; florets reddish-brown; leaves pinnatifid or uppermost entire.

15. **Artemisia** (p. 368)

3a. Heads in corymbs; florets yellow; leaves doubly pinnatifid.

16. **Tanacetum** (p. 368)

2a. Outer florets ligulate, white to pinkish-red; heads in corymbs; leaves doubly pinnatisect.

17. **Achillea** (p. 369)

1a. Herbs of low stature or prostrate; heads not in compound inflorescences.

4. Leaves alternate, simple or pinnatisectly lobed; pappus none.

5. Heads pedunculate; achenes flattened.

18. **Cotula** (p. 369)

5a. Heads sessile or subsessile.

6. Achenes 4-angled, angles hairy.

19. **Centipeda** (p. 370)

6a. Achenes flattened, winged and with stiff persistent styles.

20. **Soliva** (p. 370)

4a. Leaves radical, grasslike; heads densely clustered and sessile at bases of leaves; pappus of acute scales.

21. **Isoetopsis** (p. 370)

Senecioneae

1. Herbs, florets all tubular or the outer ones female and ligulate.

2. Involucre less than 2 cm. long; disc florets fertile, outer ones sometimes with yellow ligules.

22. **Senecio** (p. 372)

- 2a. Involucres 2-2.5 cm. long; disc florets sterile, outer fertile ones sub-ligulate.
23. **Arrhenechthites** (p. 375)
- 1a. Shrubs or small trees; all florets tubular and bisexual; leaves thick, densely woolly tomentose on undersurface.
24. **Bedfordia** (p. 375)

Arctotideae

1. Ligulate florets female; pappus none; achenes glabrous or pubescent at apex.
25. **Cymbonotus** (p. 375)
- 1a. Ligulate florets sterile; achenes (of disc florets) covered with brown or pinkish wool.
26. **Arctotheca** (p. 376)

Inuleae

1. Heads on slender peduncles or solitary on simple stems (except **Helipterum australe**).
2. Dwarf prostrate plants of high elevations, dioecious, rooting at nodes; heads at first subsessile among upper leaves, fertile (female) heads later pedunculate; pappus bristles barbellate.
27. **Parantennaria** (p. 376)
- 2a. Stems not prostrate but decumbent to erect.
3. Pappus of plumose-ciliate linear scales.
28. **Rutidosis** (p. 378)
- 3a. Pappus of simple, barbellate or plumose slender bristles.
4. Outer florets longer than inner and than the involucre, partially ligulate; laminae of involucral bracts broad and shining, with narrow claws but not radiating.
29. **Podolepis** (p. 378)
- 4a. Differing from above.
5. Involucral bracts woolly with brown scarious tips not radiating; achenes narrowed above or beaked.
30. **Leptorhynchos** (p. 379)
- 5a. Involucral bracts scarious, with or without radiating white, yellow, or reddish tips; achenes not beaked.
6. Pappus bristles plumose from base.
31. **Helipterum** (p. 379)
- 6a. Pappus bristles simple or barbellate, sometimes with apical tuft of longer hairs.
32. **Helichrysum** (in part) (p. 382)
- 1a. Not as in 1.
7. Heads shortly pedunculate, not compound in partial heads but numerous along the branches or in compound inflorescences.
33. **Inula** (p. 385)
8. Aromatic viscid annual, heads small very numerous on leafy stems.
34. **Cassinia** (p. 385)
- 8a. Perennials, heads in corymbose or pyramidal panicles.
9. Involucral bracts scarious, white, pinkish, or golden-brown but not radiating; receptacle with chaffy scales between the florets (which are not numerous per head).
34. **Cassinia** (p. 385)
- 9a. Involucral bracts with white or coloured radiating tips; receptacle without chaffy scales between florets.
32. **Helichrysum** (in part) (p. 382)
- 7a. Heads (i.e. partial heads) sessile in short spikes or grouped in compound heads which are sessile or pedunculate.
10. Heads spicate or in sessile heads surrounded by a cluster of leaves.

11. Pappus none; the 2 innermost bracts about each partial head rigid and recurved; herbs with orbicular-spathulate leaves.

35. **Stuartina** (p. 386)

11a. Pappus of fine simple bristles, soon deciduous; bracts scarious, shining; leaves linear-oblongate.

36. **Gnaphalium** (p. 388)

10a. Partial heads in dense compound heads terminating stems bearing reduced leaves; pappus plumose.

12. Achenes papillose; receptacle without chaffy scales between florets; heads globose or ovoid-oblong.

37. **Calocephalus** (p. 389)

12a. Achenes silky hairy; receptacle with scales between florets; heads more or less hemispherical.

38. **Craspedia** (p. 389)

Cynareae

1. Achenes attached by their bases to the receptacle.

2. Pappus of plumose bristles.

39. **Cirsium** (p. 390)

2a. Pappus of simple or barbellate bristles.

3. Stems with spinose wings; leaves not mottled.

4. Receptacle with hairs between the florets; stem wings narrow; pappus much longer than its achene.

40. **Carduus** (p. 392)

4a. Without hairs between the florets; stem wings broad; pappus about $1\frac{1}{2}$ times as long as achene.

41. **Onopordum** (p. 392)

3a. Stems not spiny-winged, almost glabrous; leaves green mottled with white along the veins.

42. **Silybum** (p. 394)

1a. Achenes obliquely attached to the receptacle; pappus of narrow linear free scales or absent.

5. Outer involucre bracts not resembling the leaves.

43. **Centaurea** (p. 394)

5a. Outer involucre bracts larger than the inner and similar to the foliage leaves.

44. **Carthamus** (p. 395)

Cichorieae

1. Pappus bristles not plumose, or pappus of scales.

2. Pappus bristles flattened at the base or the pappus of short scales.

3. Florets blue.

45. **Cichorium** (p. 395)

3a. Florets yellow.

4. Leaves all radical; head solitary on leafless peduncle.

46. **Microseris** (p. 395)

4a. Leaves mostly basal but not all radical; heads in cymose panicle, the outer involucre bracts passing into smaller subulate ones on the peduncle.

47. **Tolpis** (p. 396)

2a. Pappus bristles numerous and capillary.

5. Leaves all radical, pinnatifid or runcinate-pinnatifid; heads solitary on leafless hollow peduncles; achenes beaked.

48. *Taraxacum* (p. 396)

5a. Stems leafy, inflorescence branched.

6. Achenes obtuse, not beaked.

49. *Sonchus* (p. 396)

6a. Achenes narrowed above or with slender beak.

7. Main stem-simple, often covered with slender spines; achenes flattened.

50. *Lactuca* (p. 398)

7a. Stems branched from base; achenes terete.

8. Annual; heads in irregular corymbose panicles; inner involucre bracts glandular-hispid.

51. *Crepis* (p. 398)

8a. Perennial; heads axillary, sessile or subsessile along more or less glaucous wiry stems; inner involucre bracts minutely pubescent; lower leaves in rosette, runcinate-pinnatifid, stem leaves narrow and entire.

52. *Chondrilla* (p. 400)

1a. Pappus bristles plumose; achenes (at least the inner) acuminate or beaked.

9. Leaves all radical; florets with chaffy scales between them; heads paniculate, or reduced to one head with reduced bud on the stem.

53. *Hypochoeris* (p. 400)

9a. Stems leafy; florets without chaffy scales between them.

10. Plant glabrous; leaves linear, entire, broadly sheathing at base; ligules of florets violet or pinkish.

54. *Tragopogon* (p. 402)

10a. Plants coarsely scabrid or hispid; leaves lanceolate, sinuate or coarsely toothed on margins; ligules of florets yellow or orange.

55. *Picris* (p. 402)

Tribe: Astereae

1. CELMISIA Cass.

Perennial herb; radical leaves tufted, linear to narrow oblanceolate, woolly tomentose on broadened petioles and on lower surfaces, shining on upper, 6-20 cm. long; scapes simple, to 40 cm. high, usually solitary, woolly tomentose with scattered linear bracts with thin scarious apices; involucre bracts linear-acuminate, exposed surfaces woolly, ciliate above, often purplish at apices; outer florets with slender white ligules nearly twice as long as involucre, reddish on undersurface; disc florets bisexual; achenes 8-10 mm. long, striate, pubescent above; pappus of simple bristles of varying length. Common at high elevations in subalpine woodland and on exposed slopes; at similar elevations in New South Wales, Victoria, and Tasmania. 'Snow Daisy'. Fig. 355.

C. longifolia Cass.

2. ERIGERON L.

Perennial herb with rhizomatous rootstock; leaves radical, 5-9 cm. long, 1-2 cm. wide, broadly oblanceolate or obovate, narrowed below into linear base of varying length (with habitats), rounded-obtuse; margin entire or sub-serrate; both surfaces with coarse multicellular hairs especially on margins and on midrib of undersurface, also minutely glandular-pubescent; heads solitary, stem with reduced leaves and a few linear bracts, hairs dense below head; involucre 15-18 mm. long (A.C.T. plants); bracts in about 2 rows, inner slender acuminate with purple margins, as long as pale purple ligulate florets, hairy with multicellular hairs and glandular pubescence; disc florets numerous; achenes flattened, slender

with thickened margins, the shorter seed visible through wall, smooth with few glandular hairs; pappus bristles numerous, finely barbellate, shorter than achene. On high slopes above 5000 ft, e.g. summit of Mt Gingera, not common in the A.C.T.; Australian and Victorian Alps, also Tasmania. Fig. 356.

E. pappochroma Labill. var. **gunnii**
(J. D. Hook.)
Benth.

3. VITTADINIA A. Rich.

1. Perennial herb or subshrub to 40 cm. high, stems erect or stiffly spreading, *clothed with soft woolly hairs; leaves very narrowly oblanceolate or cuneate, entire or 3-lobed above, more or less conduplicate*, 1-4 cm. long, shorter on lateral shoots, apiculate, apex recurved; woolly hairs over glandular pubescence; heads terminal above reduced leaves; involucre 6-7 mm. long, outer bracts short, others linear, innermost with membranous margins and acuminate apices; violet ligules soon overtopped by developing pappus; achenes 5-6 mm. long, flattened, narrow spatulate, striate, hairs bifid at apices, appressed below but spreading above over minute glistening glandular ones; pappus slightly longer than achene, barbellate. Common species of grassland and wooded areas; New South Wales, Victoria (?), South Australia, and Tasmania. 'New Holland Daisy'. Fig. 357.

1. *V. cuneata* DC.?

1a. Stems and leaves with numerous or scanty but stiff multicellular hairs.

2. Perennial herb with tufted habit, usually less than 30 cm. high, *stems and leaves scabrid with stiff spreading hairs, glandular pubescence inconspicuous; leaves spatulate or cuneate, usually with pair of sharp teeth or lobes near obtuse apex*, angled along midrib but not conduplicate, apex recurved and callous-apiculate, less hairy on upper surface than lower; head terminal, peduncle with reduced leaves; involucre 7-8 mm. long; bracts linear to linear-lanceolate, acuminate with subulate apices, with scattered short glandular hairs and with long stiff multicellular hairs from median area; ligulate florets as in preceding species; achenes narrow spatulate, 5-6 mm. long, striate, pubescence as in preceding but glandular pubescence inconspicuous; pappus bristles barbellate to base, numerous, 7-8 mm. long. Common in grassland, woodland, and dry forest habitats; distribution as for above. 'Fuzzweed'.

2. *V. triloba* (Gaudich.) DC.

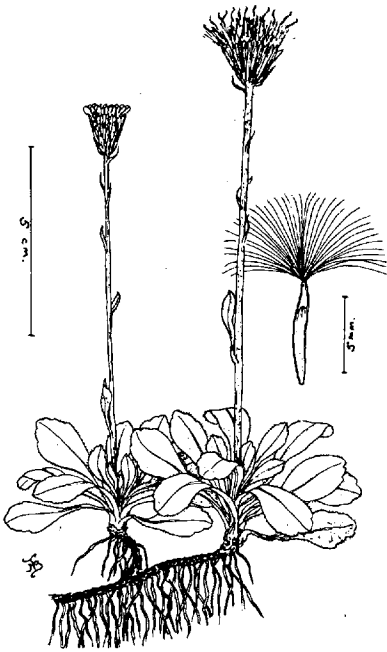
2a. Perennial herb, *often of low stature with ascendent branches from woody rootstock, stems with minute glandular pubescence with or without scattered long multicellular hairs; leaves very narrow and (local plants) commonly trifid or with pair of narrow lobes a little shorter and narrower than apical lobe*, 1-4 cm. long, less than 1 mm. wide except at base of lobes, more or less conduplicate, minutely glandular-pubescent with scattered long hairs on margins and midrib of undersurface; heads terminal, peduncles almost leafless; involucre about 8 mm. long, outer bracts short and lanceolate, *inner linear with membranous margins, ciliate on obtuse apices, minutely glandular-mottled or tuberculate*; ligulate florets as in preceding; achenes 5 mm. long, with appressed bifid-tipped hairs below and with spreading blunt clavate hairs above and with minute glandular pubescence; pappus bristles less barbellate towards base, 6-7 mm. long. In woodland and grassland habitats; also eastern New South Wales, Victoria, and Tasmania.

3. *V. muelleri* N. T. Burbidge

4. OLEARIA Moench See Willis (1956a)

1. Heads pedunculate when terminal on a leafy shoot or arranged in panicles or corymbose clusters; leaves more than 1 cm. long or, if less, stellate hairy on one or both surfaces.

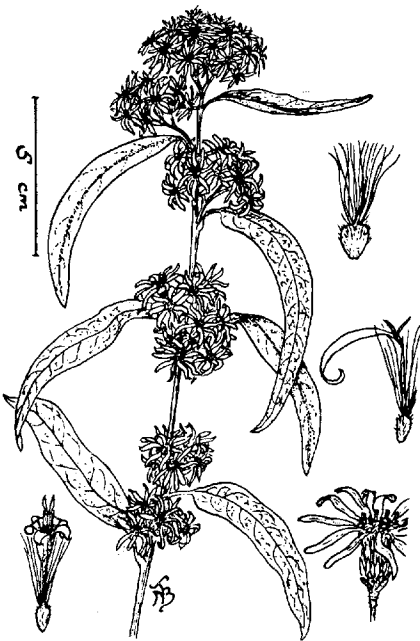
2. Leaves with lower surfaces densely covered by shining, stellate or woolly hairs; leaves not revolute on the margins.



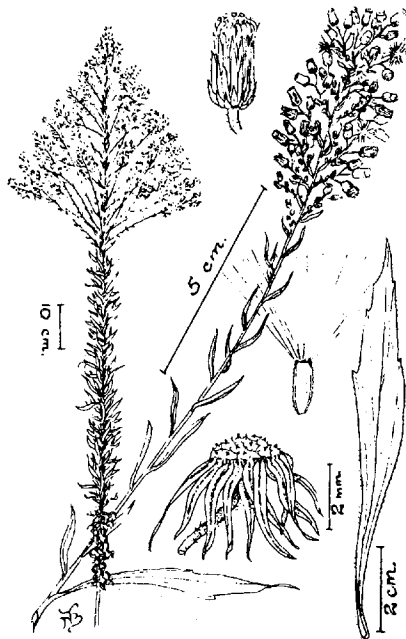
356. *Erigeron pappochroma* var.



357. *Vittadinia cuneata*



358. *Olearia lirata*



359. *Conyza floribunda*

3. Hairs on lower surfaces shining and lying close against leaf; upper surface with raised reticulate nerves (when dry); margins denticulate.

4. *Tall bushy shrubs to 3 metres or more high*, stems densely clothed with silvery or pale brown appressed hairs, later glabrescent with age; *leaves broadly elliptical, 10-20 cm. long, 3-6 cm. wide*, upper surface at first appressed hairy but soon glabrous with fine network of veinlets prominent when dry, lower surface densely silvery with closely appressed hairs, margins with shallow thickened teeth; *heads numerous in panicles which are terminal or from uppermost axils of previous season's growth*; involucre 5-6 mm. long, the few florets slightly longer, bracts narrow, densely appressed hairy; achenes ribbed, sparsely hairy, pappus bristles numerous, varying in length, longer ones with thickened more hairy apices. Common shrub of wet sclerophyll forest gullies, usually bordering creeks or in wet shaded habitats; leaves commonly light green in hue; also New South Wales, Victoria, and Tasmania. 'Silverleaf', 'Musk Tree'.

1. *O. argophylla* (Labill.) Benth.

4a. Low shrubs, sometimes diffuse in habit; leaves rarely more than 6 cm. long; heads clustered on short lateral shoots or at the ends of the branches.

5. *Shrubs rarely more than 1 metre high*, stems with dense flattened-appressed hairs or later glabrescent; *leaves narrow elliptical or linear-oblong*; upper surface soon glabrescent, dark green, veins reticulate (when dry); lower surface densely appressed-hairy, hairs commonly reddish especially on young leaves, margins with short thick teeth; peduncles longer than involucre, with narrow bracts about middle, axillary to leaves of short lateral shoots or in corymbose clusters on such shoots; involucre 8-9 mm. long, turbinate, *bracts narrow linear, densely appressed-hairy*; 5-6 outer florets ligulate, white ligules about twice as long as involucre; achenes ribbed, numerous barbellate pappus bristles not thickened at apices. Common shrub of mountain slopes, usually in colder and drier habitats than *O. argophylla* or *O. lirata*, also at lower altitudes, e.g. Burbong. Flowering October-December; also New South Wales, Victoria, Tasmania and South Australia.

2. *O. erubescens* (DC.) Dippel

5a. Closely related to preceding species but *leaves short and broadly obovate, rounded-obtuse, margins serrate-denticulate*; hairs pale or silvery; heads shortly pedunculate; *involucral bracts broadly lanceolate*, all (except short outermost ones) *almost glabrous below*, the pubescence near the apices scanty and exposing underlying glandular pubescence; margins membranous, ciliate; achenes ribbed, glabrous or almost so; longer pappus bristles sub-plumose at apices. Uncommon in the A.C.T. but found in wet sclerophyll habitats, e.g. gullies of Cotter Valley; also New South Wales, Victoria, and Tasmania.

3. *O. myrsinoides* (Labill.) Benth.

3a. Leaves tomentose below, hairs not flatly appressed and not shining.

6. Shrub to 1 metre high, *stems densely woolly tomentose*, later partially glabrescent; *leaves opposite, 5-10 cm. long, 1-3 cm. wide*, petiolate, oblong or lanceolate, obtuse or acute; upper surface green and glabrous or with scanty wool along sunken midrib, *minor veins reticulate and raised (when dry), margins entire, recurved*; lower surface densely tomentose, commonly pale biscuit colour, midrib and major veins prominent; *heads numerous in corymbose panicles* at ends of stems (sometimes subterminal as new shoots develop); branches umbellate or trichotomous, bracteate; involucre pedunculate, 6-7 mm. long, outer bracts densely and inner sparsely tomentose, shorter than florets of which 4-9 are ligulate and white; achenes strongly ribbed, sparsely hairy; pappus bristles numerous, barbellate, some of longer ones tufted at their apices. A common species of upper gullies and higher slopes of the mountains; high elevations south-eastern New South Wales and Victoria. Differs from true *O. megalophylla* (F. Muell.) Benth. in the smaller flowerheads and fewer ligules and from *O. chryso-*

phylla (DC.) Benth. and **O. alpicola** (F. Muell.) Benth. in the woolly, not silky-flattened hairs of the lower leaf surfaces.

4. **O. megalophylla** (F. Muell.)
Benth. var.

6a. Tomentum of stems and leaves stellate or of branched hairs; leaves alternate, veinlets of upper surface sunken or obscured by hairs (when dry).

7. Shrub to more than 3 metres high, young stems stellate-woolly, later glabrescent; leaves with petioles 5-10 mm. long, *narrow to broad lanceolate, 6-15 cm. long, 1-3 cm. wide*, margins slightly recurved, entire or rarely undulate or with shallow teeth; upper surface soon scabrid except along main veins; lower surface pale with dense stellate tomentum; heads in corymbose panicles terminal to shoot or to short axillary branches; involucre 3-4 mm. long, outer bracts woolly stellate or with branched hairs; inner more or less glabrous except near ciliate obtuse apices where underlying glandular pubescence is exposed; ligulate florets 10-14, white; achenes twice as long as broad, obovoid but flattened, ribs obscured by short bifid hairs; pappus $1\frac{1}{2}$ times as long, outer bristles flattened and narrow lanceolate, longer inner ones thickened at apices. Common shrub of mountain gullies and along creeks, flowering October-November; also New South Wales, Victoria, and Tasmania. 'Daisy Bush'. Fig. 358.

5. **O. lirata** (Sims) Hutchinson

7a. Leaves obtuse, varying from slender linear-oblong to shortly oblong, subsessile or very shortly petiolate (petioles less than 3 mm. long); heads clustered or solitary on short laterals along spreading branches.

8. Shrub to 2 metres high, stems with scurfy stellate tomentum or later glabrescent; *leaves linear-oblong to lanceolate-oblong, 2-6 cm. long*, obtuse, margins entire or undulate-denticulate, shortly petiolate; *upper surface rugose-scabrid with deeply sunken veinlets*, minutely glandular-pubescent below scattered stellate hairs; undersurface pale, densely tomentose, veins prominent; *heads in short corymbose racemes of 2-8 heads*, terminating short lateral shoots; involucre 3-4 mm. long, outer bracts densely and inner sparsely stellate-tomentose, margins ciliate; ligules 9-12, white; achenes slender, about 3 times as long as broad, ribbing obscured by bifid hairs of which *upper ones form a short collar at base of pappus* which is 2-3 times length of achene; outer bristles often narrow lanceolate and lacinate, longer with thickened tips. Plants often greyish-green in hue, found on upper slopes above 4500 ft. Also high elevations New South Wales, Victoria, and Tasmania. A variable species but among A.C.T. specimens only the following can be separated as distinct. 'Alpine Daisy Bush'.

6a. **O. phlogopappa** (Labill.) DC.

8a. Low shrub, pale grey with stellate tomentum which is more persistent than in preceding species, often yellowish on young shoots; *leaves oblong to oblanceolate, sessile or subsessile, 7-15 mm. long, 2-4 mm. wide*, margin entire or serrulate, both surfaces with stellate hairs though sparsely so on upper; *heads solitary (rarely 2) at ends of short leafy lateral shoots*, peduncles shorter than or slightly longer than uppermost leaves; *involucre 6-8 mm. long*, outer bracts broadly ovate, exposed surfaces densely tomentose, margins membranous, ciliate and often purplish; 14-20 florets with white ligules. One of a number of forms of the polymorphic **O. phlogopappa**, found on high mountain slopes. 'Alpine Daisy Bush'.

6b. **O. phlogopappa** var. **subrepanda** (DC.) J. H. Willis

2a. Leaves narrow with revolute margins or thick with recurved margins, glabrous or viscid with glandular hairs.

9. Erect herbaceous subshrub of slender habit, sparsely glandular-hairy on young parts; *leaves with conspicuous glandular tuberculate swellings, 3-6 cm. long, 1-1.5 mm. in width*,

narrow linear with closely revolute margins; heads less than 10 mm. diameter (fresh), numerous in corymbose terminal panicles; *involucres* 2·5-3 mm. long, bracts glandular-hairy, their pale margins ciliate; florets numerous, *ligules* white; achenes angular, hairy with minute collar of hairs at base of pappus, bristles almost smooth at base, sometimes thickened at apex. Probably a short-lived perennial, found in mountain gullies in wet or watered habitats near creeks. New South Wales, Victoria, Tasmania, and South Australia.

7. *O. glandulosa* (Labill.) Benth.

9a. Diffuse scrambling or erect shrub to 1 metre high, *stems and leaves viscid with projecting glandular hairs; leaves dark green, 1-2·5 cm. long, 1-1·5 mm. in width, thick so that the margins though recurved seem to be revolute; heads solitary, terminal, more than 1 cm. diameter in flower, peduncle little longer than uppermost leaves but sometimes uppermost leaves passing into outer bracts; involucre 7-10 mm. long, outermost bracts subulate, loose below base; intermediate ones with pale broad bases and green subulate apices; innermost obtuse with subulate apices, all glandular-hairy; florets numerous, outer 12-15 with blue or purple ligules; achenes dark brown, minutely scabrid with loosely appressed hairs; pappus of scabrid bristles, shorter ones flattened at base, longer with thickened apices. In forest habitats below 3000 ft. The only blue-flowered species known in the A.C.T.; also New South Wales and north-eastern Victoria.*

8. *O. tenuifolia* (DC.) Benth.

1a. Heads small, appearing sessile though terminal to minute lateral shoots along the branches; leaves less than 5 mm. long.

10. Slender shrub to 1·5 metres high, stems with glandular and sparse woolly hairs, sometimes viscid; *leaves 3-5 mm. long, oblong or obovate, minutely petiolate; upper surface green and scabrid, margins recurved; undersurface with brownish or green tomentum; heads numerous along upper sides of higher branches, on very short leafy shoots; involucres 3·5-4 mm. long, bracts few, glabrous below with woolly and glandular hairs above; margins membranous, lacinate-ciliate, sometimes purplish; florets less than 18 and more than half with white ligules; achenes brown, slender, with shining brown glandular hairs and sparse woolly ones, pappus bristles scabrid to base, about 1½ times as long as achene. Floriferous species of dry sclerophyll forest habitats below 2500 ft, not common in the A.C.T.; New South Wales and Victoria. Flowering mid to late Spring.*

9. *O. microphylla* (Vent.) Maiden
et Betche

10a. Shrub to 2 metres high, stems with white woolly or webby hairs and glandular pubescence, more or less glabrescent later; *leaves minute, usually less than 2 mm. long, thick, spreading or recurved, oblong, green and glabrous on upper surface, margins thick and revolute over tomentum of lower surface; heads small but numerous, terminating lateral branches of which the upper are very short so that branches form leafy floriferous panicles; involucres 2·5-3 mm. long, bracts few, broadly oblong, lanceolate, almost glabrous, margins and apices membranous-ciliate; florets less than 12 of which 5-6 are ligulate; achenes light brown, angular, with sparse glandular and longer white hairs with bifid apices; pappus bristles scabrid to base, about 1½ times as long as achene. In habitats marginal to swamps at high elevations; New South Wales, Victoria, Tasmania, and South Australia.*

10. *O. floribunda* (J. D. Hook.)
Benth.

5. *CONYZA* Less. See Cronquist (1943)

1. Annual herb to 1 metre high, stem branched above, stems and leaves clothed with scabrid antrorsely curved hairs; *leaves linear, 2-7 cm. long, 1-7 mm. wide (decreasing up stem), of greyish-green hue, flat or undulate, broader ones sometimes toothed, apices acute; heads in*

short racemose panicles often shorter than the leafy shoots from upper axils; involucre 5-6 mm. long, narrow cylindrical with obtuse base (fresh); bracts narrow, intermediate and inner with subulate or acuminate apices, coarsely hairy; outer florets very slender or filiform with minute ligules; exposed receptacle of old heads not or only slightly pitted, sometimes only marked by raised basal scars of fallen achenes; reflexed bracts with hirsute tips, usually pale on inner face; achenes flattened, thin apart from margins, sparsely covered with short appressed hairs; pappus of soft fine white or pinkish bristles. Widespread weed throughout temperate Australia and Tasmania, believed to be of South American origin but now found in many countries; in the A.C.T. common on waste and cultivated areas and along roadsides. 'Flaxleaf Fleabane'.

1. **C. bonariensis* (L.) Cronq.

1a. Inner involucre bracts almost or quite glabrous; receptacle of old heads strongly angular-pitted; involucre to 5 mm. long; upper part of plant forming a large pyramidal panicle.

2. Robust erect annual herb, to 2 metres high; stems and leaves scabrid with spreading hairs, stems commonly yellowish-green in colour; leaves 3-10 cm. long, 2-12 mm. wide, linear-elliptical or oblanceolate, larger basal ones often serrate in upper half; involucre numerous, 4-5 mm. long, florets fewer than in preceding species; apices of inner bracts glabrous or almost so apart from few hairs on midrib; receptacle conspicuously pitted, pits with projecting points at the angles, reflexed bracts brown on inner face; achenes as in preceding but smaller; pappus straw-coloured. Common weed on waste and cultivated areas; of American origin but widely naturalised in south-eastern temperate Australia and Tasmania. 'Tall Fleabane'. Fig. 359.

2. **C. floribunda* H. B. K.

2a. Erect herb similar to *C. floribunda* but differing in stems often reddish, and hirsute with coarse sparse hairs; leaves with the coarse hairs almost restricted to margins and to midrib of undersurface; upper part of plant pyramidal; involucre 3-4 mm. long, florets less numerous than in either of preceding species, bracts narrow-linear and glabrous or almost so, innermost with ciliate acute or obtuse apices; receptacle pitted as in *C. floribunda*, reflexed bracts brown or whitish within; achenes as in above. Of North American origin, in similar habitats to the preceding. 'Canadian Fleabane'.

3. **C. canadensis* (L.) Cronq.

6. **ASTER** L.

Annual (or biennial?) herb, to 1 metre high, branched above, stems stiff, glabrous, often reddish; leaves 2-10 cm. long, narrow linear to elliptical or narrow lanceolate, acute with callous apex; heads numerous, terminal and along smaller branches, subtended by leafy bracts; upper part of plants forming leafy panicle; involucre 5-7 mm. long, narrow at base, bracts often reddish with green centre, in 3-4 rows, outer lanceolate, inner linear acuminate, all later spreading but less reflexed than in *Conyza*; receptacle angular-pitted; florets not numerous, outer with narrow pinkish (drying blue) ligules; achenes slender, 1.5-2 mm. long, 4-5-ribbed, sparsely hairy, bristles in single row, 4-5 times as long as achene. A weed of American origin, naturalised in New South Wales, Victoria, South Australia, and Tasmania (islands of Bass Str.); in the A.C.T. usually found in damp habitats near water, flowering late summer. 'Bushy Starwort'. Fig. 360.

**A. subulatus* Michx.

7. **BRACHYCOME** Cass. See Davis (1948)

1. Peduncles scapose, arising from basal rosette and leafless or with reduced leaves or bracts in lower half to two-thirds.

2. Achenes without wings.

3. Plants glabrous; seeds flattened, pappus minute.

4. Perennial stock bearing dry fibres of old leaves; *leaves oblanceolate or elliptical, obtuse, entire, narrowed below to slender base at least as long, 6-15 cm. long, 5-15 mm. wide; scape 12-30 cm. high, leafless or with small linear bracts towards summit; involucre bracts oblong, gibbous at base, 5 mm. long, about $\frac{1}{2}$ as wide, membranous margins purple above; ligulate florets more than 40, white or mauve; achenes cuneate-obovate, glabrous with riblike margins. A mountain daisy usually found near 4000 ft in the A.C.T., associated with damp habitats in subalpine communities; south-eastern Queensland to Victoria.*

1. **B. scapiger** (Sieb. ex Spreng.)
DC.

4a. Herb similar to preceding; *leaves obovate or oblanceolate, slender base rarely more than $\frac{1}{2}$ as long as blade, margin entire or crenate or serrate in upper half, obtuse or acute; scapes 8-20 cm. high, often solitary, leafless or with 1 small linear bract; oblong involucre bracts not gibbous at base, 5.5-7 mm. long, about $\frac{1}{2}$ as wide, with conspicuous purple margins which are glandular-laciniate; ligulate florets less than 40, white or mauve; achenes oblong-cuneate, hairy on flat sides, thick margins with minute groove. In similar habitats to **B. scapiger** in the A.C.T.; distributed from south-eastern New South Wales to South Australia and Tasmania.*

2. **B. decipiens** J. D. Hook.

3a. Plants glandular-pubescent, tufted, sometimes with persistent dry stems; *radical leaves 3-8 cm. long, spatulate and lobed or pinnatifid in upper half, petiole broadened below; stem leaves on lower half to two-thirds of stem, lower ones narrow, pinnately lobed but with half-clasping bases, upper linear and entire; involucre bracts 8-9 mm. long, oblong with scarious acute apices, minutely glandular-pubescent; achenes cuneate, glabrous, compressed but thick, conspicuous pappus obliquely placed. In dry sclerophyll habitats, e.g. Kowen area near Queanbeyan, Mt Majura, Mt Coree, and slopes along Lake George (N.S.W.); eastern New South Wales, Victoria, and south-eastern South Australia.*

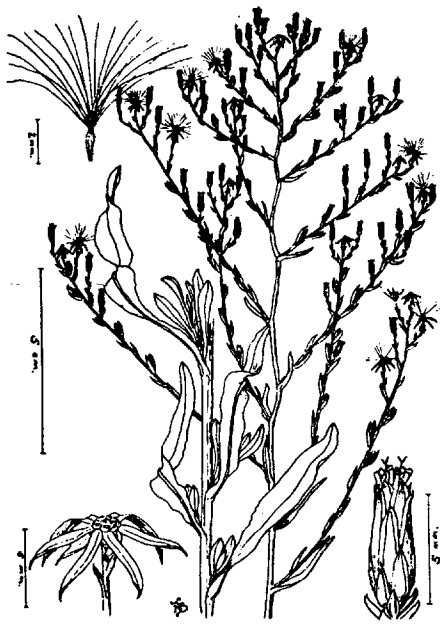
3. **B. diversifolia** (Grah.) Fisch. et
Mey. var. **diversifolia**

2a. Achenes winged.

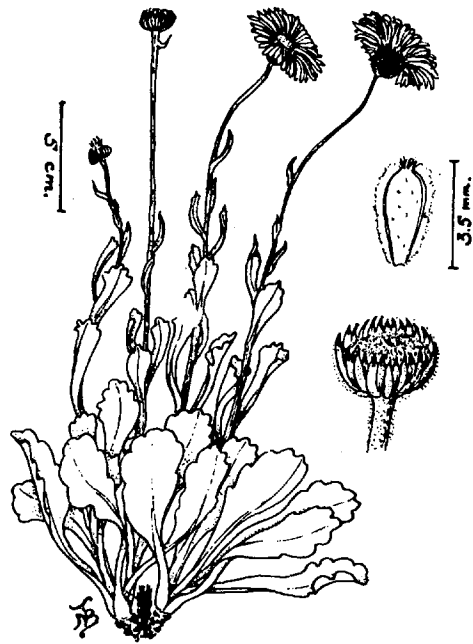
5. *Glabrous perennial herb; leaves doubly pinnatisect and (with petioles) to 12 cm. long, leaf segments linear with callose apices; scape 10-30 cm. high, commonly with few reduced leaves along lower half; involucre 1.5 cm. diameter; bracts oblong, gibbous at base; margins membranous above, with glandular hairs; ligulate florets 25-40, white; achenes flattened with well-developed wings bearing marginal hairs, body with glandular hairs up median line, pappus conspicuous. An alpine species growing in damp sites on higher mountain slopes, e.g. summit of Mt Gingera; Australian and Victorian Alps.*

4. **B. nivalis** F. Muell. var. **nivalis**

5a. *Glandular-pubescent herb with well-developed rosette and erect stems 30-50 cm. high, unbranched, bearing narrow leaves; radical and lowest leaves of stem 5-10 cm. long, 1-3 cm. wide, obovate to spatulate, margin crenate above, apex rounded-obtuse; stem leaves 1-5 cm. long, cuneate or oblanceolate, crenate or serrate in upper third or trilobed or, if placed high, elliptical and entire but stem bare below involucre which is 1-1.5 cm. diameter; bracts 8-9 mm. long, oblong but abruptly narrowed to acuminate apex, margins often purple and laciniate with glandular hairs; ligulate florets 40-60, mauve; achenes 3-4 mm. long, body with few minute glandular hairs, wings conspicuous and subentire or irregularly crenate, with minute cilia, pappus conspicuous and filling narrow apical notch. Common species of*



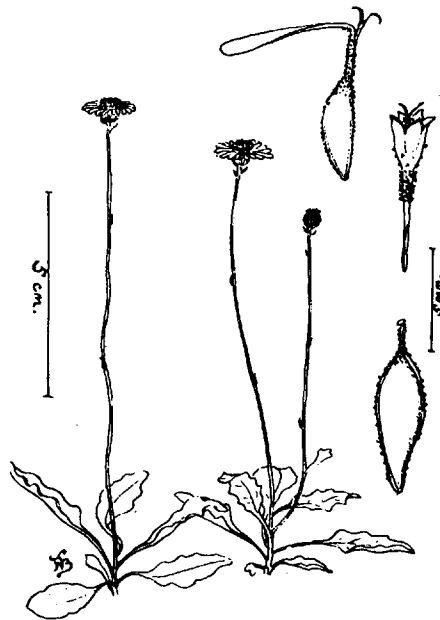
360. *Aster subulatus*



361. *Brachycome scapiformis*



362. *Brachycome rigidula*



363. *Lagenophora stipitata* var.

alpine and subalpine habitats; from south-eastern Queensland to South Australia and Tasmania. (Included in *B. aculeata* (Labill.) Less. by Davis.) Fig. 361.

5. *B. scapiformis* DC.

1a. Stems leafy and branched with heads terminal to main and upper shoots; radical leaf tuft normally absent.

6. Leaves acutely toothed, trilobed or pinnatifid with acute-mucronate lobes.

7. Stems and involucre bracts with glandular hairs.

8. Perennial herb, weakly erect branched stems leafy to middle or above, 30-60 cm. high; leaves oblanceolate, cuneate or the uppermost oblong; lowest attenuate at base and obtusely toothed or serrate, intermediate serrate above or trilobed, uppermost entire; involucre usually less than 1 cm. diameter, bracts 6-7 mm. long, oblong with membranous acute or obtuse apices, margin glandular-hairy; ligulate florets white (sometimes mauve or pink), less than 40 in number; achenes as in preceding species but pappus small and not filling notch. In similar sites to preceding but less common at the lower levels of the altitudinal range.

6. *B. aculeata* (Labill.) Less.

8a. Perennial herb with trailing or ascendent to erect stems to 60 cm. high, clothed with glandular hairs; leaves 1-2 cm. long, pinnatifid with linear segments with callose-mucronate apices, concave or channelled above (when dry); involucre 5-10 mm. diameter, often numerous, peduncles bare or with 1 or 2 linear bracts, involucre bracts 4-5 mm. long, linear-lanceolate, apices membranous-laciniate; ligulate florets 30-40, blue to light purple; achenes 2.5-4 mm. long, narrow obovate, body dark coloured; wings pale, entire or lobed but not forming notch for the conspicuous pappus; dry stems of old growth persistent giving twiggy aspect. In dry sclerophyll habitats in woodland or forest, e.g. Black Mountain; south-eastern Queensland to Tasmania. Fig. 362.

7. *B. rigidula* (DC.) G. L. Davis

7a. Erect perennial herb to 20 cm. high (local plants), stems and leaves with sparse woolly hairs and with or without glandular pubescence; leaves 1-4 cm. long, narrow cuneate and trilobed or upper ones entire; peduncles slender, bare for some distance below heads; involucre 4-5 mm. long, bracts oblanceolate, apices membranous and acute or obtuse with few woolly hairs and minute glandular pubescence; ligules white (= var. *marginata*), 20-30; achenes about 3 mm. long, almost as wide (with wings), broad body tuberculate, pale wings deeply cut into flat-topped cuneate lobes; pappus conspicuous. Not common in the A.C.T., found in dry sclerophyll habitats; Queensland to Victoria and South Australia.

8. *B. marginata* Benth. var. *marginata*

6a. Leaves entire and narrow, linear or elliptical with slender base, if linear a few leaves with 1-4 projecting linear but obtuse lobes.

9. Branched weak-stemmed herb, glandular-pubescent or sparsely so; leaves narrow elliptical, attenuate into very slender base sometimes as long as blade, the two 3-13 cm. long, 3-8 mm. wide, entire, acute, base half clasping; involucre 3.5 mm. diameter, bracts glandular hairy, oblong linear with membranous apices; ligulate florets 20-30, mauve or white; achenes turgid without conspicuous wing, pappus minute (wings are present but swollen around body of achene). Usually found among grasses at low and intermediate altitudes but not common in the A.C.T.; south-eastern Queensland to Victoria, South Australia, and Tasmania.

9. *B. graminea* (Labill.) F. Muell.

9a. Stoloniferous glabrous perennial herb, stems ascendent; leaves sometimes appearing tufted and basal in small plants but not in rosette, distant on longer stems, linear 5-12 cm.

long, obtuse, entire or rarely with 1-4 spreading linear lobes, bases half-clasping; involucre not numerous, 5-7 mm. diameter; bracts 3-4 mm. long; ligulate florets 30-40, white or mauve; achenes about 2.5 mm. long, wings inflated and entire but minutely ciliate, pappus conspicuous. Not common in the A.C.T., collected in Naas Valley in a wet swampy area; eastern New South Wales, Victoria, and Tasmania.

10. *B. radicans* Steetz ex Lehm.

8. **LAGENOPHORA** Cass. See *Cabrera (1966), Davis (1950a)*

1. Stoloniferous perennial herb, leaves in basal tuft, 2.5-9 cm. long, *conspicuously hirsute*, spatulate, obovate or oblanceolate, narrowed to slender petiole, crenate to deeply serrate, acute or obtuse; *scape hirsute*, especially towards apex, with or without few distant narrow bracts; *involucral bracts 3.5-4.5 mm. long, narrow linear, rigid below but with slender acuminate apices*, sparsely glandular on back, sometimes sparsely hirsute on midrib, *margins glandular-ciliolate* especially towards apices; ligulate florets usually mauve, sometimes pale, tube glandular; disc florets sterile; achenes flattened-flask-shaped, glandular on margins and on narrow beak which terminates in pale collar. Common species of forest habitats from low to high altitudes but more common in drier sites than the following; widespread in southern and western Australia, Tasmania, also Papua-New Guinea.

1a. *L. stipitata* (Labill.) Druce var. *stipitata*

1a. Differing from above in slender habit, stems often leafless below tuft when growing through sphagnum; *leaves sparsely and shortly hirsute*, 1.5-5 cm. long, blade commonly less than 2.5 cm. long and oblanceolate to elliptical above slender petiole, *margin subentire or with distant narrow shallow teeth; scape almost glabrous or with sparse more or less appressed weak hairs; involucral bracts 2.5-3 mm. long, linear-oblong, obtuse to acute*, subglabrous or minutely glandular above, *margins erose and glandular*; florets as in above but ligules sometimes white or pink rather than mauve; achene as in above but with distinct patch of glands on each face at the base. A high altitude form of the above, always in swampy habitats and commonly growing through sphagnum. Based on a Tasmanian plant and likely to occur also in the Victorian and Australian Alps. Fig. 363.

1b. *L. stipitata* (Labill.) Druce var. *montana* (J. D. Hook.) Cabrera

9. **SOLENOGYNE** Cass. See *Davis (1950b)*

Perennial tufted herb with radical leaves commonly lying flat against soil, more or less hispid; leaves obovate to oblanceolate, obtuse, 3-10 cm. long, more or less narrowed at base, crenate, toothed or subentire; scapes robust, peduncles often very short, never much longer than leaves; heads 4-6 mm. diameter, involucral bracts 2-2.5 mm. long, oblong, obtuse, glabrous, margins thin, irregular; florets about as long as bracts, outer dark-coloured with very slender corollas split on one side but scarcely ligulate; disc florets sterile; achenes narrow obovoid, apiculate, lacking pappus. Not uncommon in grassy habitats, often persistent in lawns; found over a wide altitudinal range; Queensland to Tasmania and South Australia. Fig. 364.

S. gunnii (J. D. Hook.) Cabrera

10. **CALOTIS** R.Br. See *Davis (1952)*

1. Stoloniferous perennial herb, glabrous or sparsely hairy, scapes to 20 cm. high; *leaves 3-10 cm. long, bipinnatifid with narrow linear mucronate segments*, slender petiole with broader base on radical leaves; stem leaves smaller, entire or toothed and bract-like; involucre to 1 cm. diameter, soon globular as achenes develop; ligulate florets white, bisexual, disc florets male; *achenes flattened, body glabrous and laterally winged below the 7-14 retrorsely hairy awns*. Commonly associated with low-lying damp sites on mountain slopes, also near

Canberra; central and southern New South Wales and western Victoria. 'Burr Daisy'. Fig. 365.

1. *C. anthemoides* F. Muell.

1a. Leaves simple, entire or toothed; achenes not winged.

2. Stoloniferous perennial herb with sparse septate hairs, scapes to 30 cm. high; *radical leaves elliptical or narrow oblanceolate*, 5-15 cm. long, entire or distantly toothed, attenuate at base; stem leaves without narrow base, entire or with few acute teeth, 1-3 cm. long, acuminate; involucre 1-1.5 cm. diameter, bracts ovate with both septate and glandular hairs; *ligulate florets blue-mauve*; *achenes with 4-6 rigid awns hairy at their bases and as long as the body as well as a number of shorter secondary awns*; body cuneate, sunken and densely hairy along median line. In dry sclerophyll habitats, not common in the A.C.T. but collected in Gudgenby area; widespread in south-eastern Australia (New South Wales and Victoria). 'Blue Burr Daisy'.

2. *C. scabiosifolia* Sond. et F. Muell. var. *integrifolia* F. Muell. ex Benth.

2a. *Woody much branched perennial subshrub*, stems very slender, to 30 cm. high from thick rootstock, sparsely clothed with septate hairs; *leaves only along stems, elliptical or linear*, less than 1 cm. long (local plants), 2 mm. wide; peduncles numerous, longer than upper leaves; *heads yellow*, soon globular and 5 mm. diameter; involucre bracts linear-oblong, hairy, margins ciliate; *ligulate florets female*, in several rows, ligules less than 3 mm. long; *body of achene broadly cuneate and flat, tuberculate, a major awn from each upper angle, secondary shorter awns between, all barbed and with retrorse hairs*. Not uncommon in dry sclerophyll habitats at lower elevations; also widespread Queensland to Victoria, occasional in South Australia and Western Australia. 'Yellow Burr Daisy'.

3. *C. lappulacea* Benth.

Tribe: Heliantheae

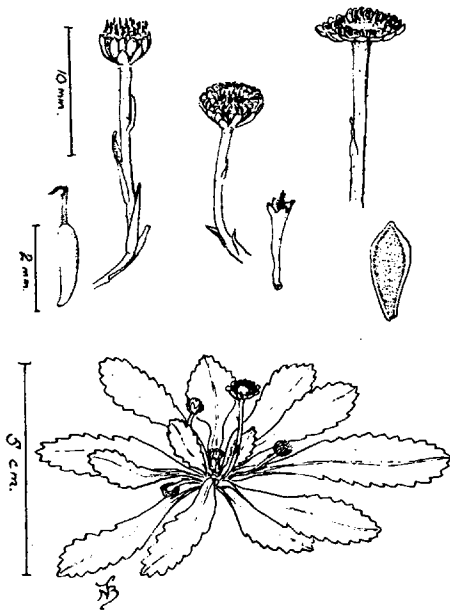
11. XANTHIUM L.

Erect or ascendent branched annual to 70 cm. high, stems sparsely pubescent; leaves alternate with two rigid 3-branched spines at base of petioles, blades 2-10 cm. long, lanceolate or 3-5-lobed or irregularly lobed; hairs dense along nerves of upper surface which is otherwise sparsely pubescent, lower surface pale and densely pubescent except on nerves; male florets at ends of branches in involucre of free bracts; female florets in an involucre of fused bracts forming a pubescent ellipsoid burr 10-12 mm. long covered with spreading glabrous hooked spines. Of South American origin; now a widespread weed throughout much of temperate Australia and Tasmania; mid to late summer weed of waste areas around Canberra and elsewhere in the A.C.T. 'Bathurst Burr'. Fig. 366.

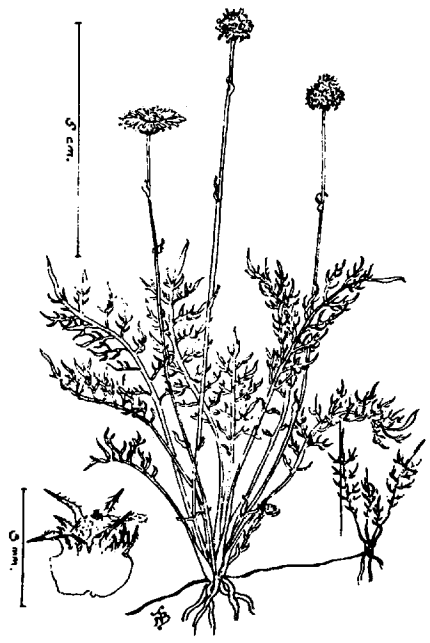
**X. spinosum* L.

12. SIGESBECKIA L. See Brummit (1967)

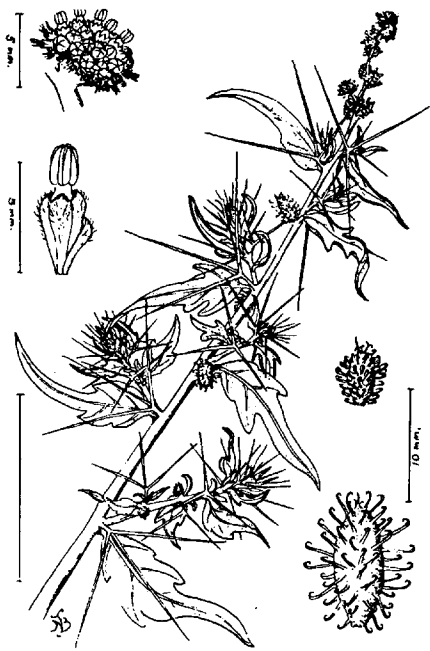
Ascendent annual herb, hispid with septate hairs; leaves opposite, ovate to lanceolate, 2-12 cm. long, abruptly narrowed to slender petiole, acuminate, margin irregularly toothed, sparsely hispid on both surfaces, the lower with glistening droplets; heads pedunculate in upper axils or in leafy panicle; outer involucre bracts linear-spathulate with non-glandular septate hairs, not longer than boat-shaped inner bracts which embrace the outer female florets which each have a yellow ligule; receptacle with bractlike scales each enclosing a bisexual floret; achenes curved and swollen above, black, pappus lacking. A widespread weed in many warm countries; also throughout eastern and warmer parts of Australia except coastal areas; uncommon in the A.C.T. Differs from *S. orientalis* in shorter involucre



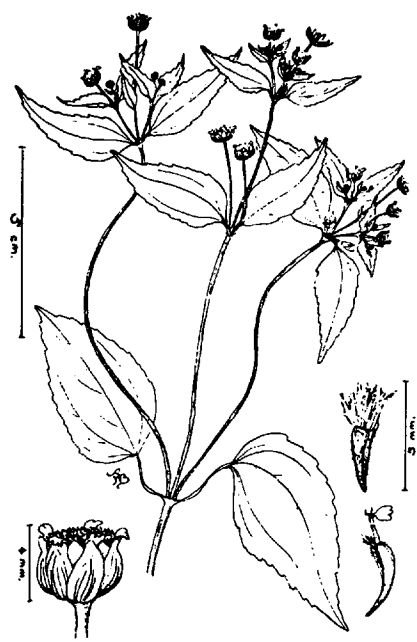
364. *Solenogyne gunnii*



365. *Calotis anthemoides*



366. *Xanthium spinosum*



367. *Galinsoga parviflora*

bracts, the outer ones lacking conspicuous gland-tipped hairs. The latter occurs on more coastal areas and eastern slopes of the ranges in eastern Australia.

S. microcephala DC.

13. *BIDENS* L.

Coarse annual to 1 metre high, stem glabrous or with septate hairs; leaves opposite, pinnate with 3-5 leaflets; petioles hirsute on upper side and ciliate on margins and clasping base; leaflets petiolulate or sessile, ovate to lanceolate, denticulate-serrate with obliquely acute teeth, scabrid or subglabrous on upper surface, hispid on prominent nerves of lower; heads pedunculate in terminal panicles; involucre 5-7 mm. long; outer bracts linear, ciliate; inner broader with broad pale margins ciliate towards apex; tubular florets not longer than awns of young achenes; achenes black, narrow linear, striate, 7-12 mm. long, with short stiff erect hairs in upper third; awns 2-4, brown, erect or slightly spreading, 2-3 mm. long, retrorsely barbed. Widespread weed in many warm countries, common in parts of eastern Australia, also South Australia, rare weed in the A.C.T. 'Cobbler's Pegs'.

**B. pilosa* L.

14. *GALINSOGA* Ruiz et Pavon

Ascendent annual to 60 cm. high, more or less hairy or subglabrous on stems; leaves opposite, 2-6 cm. long, petioles slender, blades ovate to ovate-lanceolate, acuminate, crenate-toothed or subentire, sparsely hairy on upper surface and nerves of lower; heads on long slender peduncles in upper axils, forming a diffuse corymb; involucre 3-4 mm. long, bracts ovate, glabrous with green veins, outer 3 narrower; ligulate florets about 5, with short white ligules; disc florets numerous, bisexual with scarious often trifid scales between them; achenes 1.5 mm. long, black, angular, narrow-turbinate, sparsely hairy; pappus of plumose scales which are more numerous on disc achenes. Of South American origin, widely naturalised in southern and eastern Australia and Tasmania; uncommon in the A.C.T., garden weed in damp habitats or near water. 'Potato Weed'. Fig. 367.

**G. parviflora* Cav.

Tribe: *Anthemideae*

15. *ARTEMISIA* L.

Perennial herb, stems erect to 2 metres high from branching rhizome; leaves ovate in outline but deeply pinnatifid with narrow lobes, 4-10 cm. long, glabrescent and green above, white with appressed tomentum on undersurfaces, lowest lobes close to short petiole and stipule-like; upper leaves more or less entire except for basal lobes; heads 3 mm. long, cylindrical or ovoid, clustered in leafy spikes forming panicles; involucral bracts sparsely woolly; florets all tubular and fertile, outer ones female with minute 3-toothed corolla, inner bisexual; achenes about 1 mm. long, pappus lacking. Of European origin, naturalised in New South Wales and Victoria; occasionally found in areas near Canberra. 'Mugwort'. Fig. 368.

A. vulgaris L. var.

16. *TANACETUM* L.

Stoloniferous aromatic perennial herb, stems erect to 1 metre high; striate, reddish, minutely and sparsely glandular-pubescent with sparse webby hairs at base of petioles and on younger parts; leaves compoundly pinnatifid, 15-20 cm. long (upper ones smaller), sparsely webby tomentose or glabrescent, gland-pitted on both surfaces, ultimate lobes acute-acuminate with callous apices, lower leaves petiolate, upper sessile; heads shortly pedicellate in terminal corymbose panicles; involucre cupular, 3-5 mm. long, 7-10 mm. diameter; bracts pale green, inner with brown scarious margins and apices; florets golden-yellow, projecting slightly above involucre; achene 1.5-1.75 mm. long, glabrous, oblong-

obovoid, ribbed; pappus a minute toothed crown. Uncommon in the A.C.T. but collected as roadside weed near Hall; possibly a garden escape. Native to Europe and Asia; once cultivated as medicinal herb; naturalised near settlements in some parts of temperate Australia and Tasmania. 'Tansy'. Fig. 369.

**T. vulgare* L.

17. ACHILLEA L.

1. Stoloniferous perennial herb, flowering stems erect, woolly-villous, striate; leaves 4-10 cm. long, 2-3-times pinnatisect, *rhachis narrow without small pinnae between larger ones*, villous, ultimate lobes linear-subulate, apices hyaline-mucronate; heads in terminal corymbs, ovoid involucre 3.5-4 mm. long, bracts scarious with thickened midrib, ligulate florets about 5, white to pink-red, disc florets between narrow scarious acuminate scales; achenes compressed, pappus lacking. Of north temperate origin, formerly used for medicinal purposes; naturalised in New South Wales, Victoria, and South Australia. In the A.C.T. it is naturalised in moist habitats in some disturbed areas, often a troublesome weed in local lawns. 'Milfoil', 'Yarrow'. Fig. 370.

1. **A. millefolium* L.

1a. Stoloniferous perennial herb similar to preceding but of coarser habit, to 1 metre high; leaves 7-15 cm. long, compoundly pinnatisect, *rhachis winged and commonly with small mucronate lobes between pinnae*, ultimate lobes of pinnae obtusely mucronate, apices hyaline; heads corymbose, involucre 5-6 mm. long, ligulate florets 5, white or pink-red; achene as in preceding. Of European origin; a highly polymorphic species of which some forms are grown in gardens; naturalised in some areas of temperate Australia and Tasmania; local occurrence recorded for Uriarra area (single collection).

2. **A. distans* Waldst. et Kit. ex Willd.

18. COTULA L.

1. Hirsute or loosely villous decumbent or ascendent *annual* (rarely overwintering), 5-20 cm. high; *leaves not punctulate on upper surface*, once or twice pinnatisect with narrow oblanceolate acute lobes, radical and lower leaves petiolate, bases stem-clasping; upper leaves more or less sessile with lobed scarious clasping bases; heads terminal, *peduncles very slender*, involucre 3-4 mm. diameter; bracts linear-oblong, obtuse, sparsely hairy or glabrous; outer 3-4 whorls of florets female, lacking corollas, disc florets hermaphrodite with 4-lobed corollas; *ray achenes on slender pedicels*, flattened, papillose hairy between the thickened margins; disc achenes narrower but turgid, not markedly flattened, subsessile. Common in dry sclerophyll habitats especially at lower elevations, also a weed of waste areas near settlements; throughout temperate Australia and Tasmania and possibly introduced in New Zealand. 'Common Cotula'.

1. *C. australis* (Sieb. ex Spreng.) J. D. Hook.

1a. Stoloniferous perennial herbs with prostrate branches and short erect robust peduncles; leaves glandular-punctulate on upper surfaces; achenes sessile.

2. *Villous-hirsute plants*; leaves 2-8 cm. long, *doubly pinnatifid*, petioles slender, as long as or longer than blade and with broad clasping bases; ultimate pinnae acute-mucronate with hyaline apices; heads terminal to short erect shoots with tufted leaves; peduncles 1-2 cm. long (in flower), lengthening to 5-6 cm. later; involucre 5-6 mm. diameter (flower) later 12 mm.; bracts oblong, obtuse, hairy; female florets in several rows, with *minute flattened corollas* bearing glistening droplets on the angles; disc florets sterile; achene compressed, *corolla persistent*. Usually in shaded damp habitats in mountain forests, on gully slopes or

near creeks. New South Wales, Victoria, and Tasmania. 'Mountain Cotula'. Fig. 371.

2. *C. filicula* (J. D. Hook.) J. D. Hook. ex Benth.

2a. *Glabrous plants*; leaves 1-3.5 cm. long, *once pinnatifid*, lobes oblanceolate, acute with pale but scarcely mucronate apices; peduncles shorter than leaves when in flower, to 4 cm. in fruit; involucre 3-4 mm. diameter, bracts oblong, obtuse; female florets without corolla, disc florets usually sterile; achene cuneate, concave on one face, compressed with sharp angles, few papillose hairs near top and on apical margin. In wet sites or partially submerged in sphagnum swamps at high elevations; south-eastern New South Wales, Victoria, and Tasmania. 'Alpine Cotula'.

3. *C. alpina* (J. D. Hook.) J. D. Hook.

19. CENTIPEDA Lour.

1. *Erect or ascendent perennial herb*, sometimes flowering in first season; stems with webby hairs (especially in leaf axils) or glabrescent; leaves linear-oblanceolate to narrow spatulate, 0.6-2 cm. long, bases half clasping, with numerous glandular 'droplets' on both surfaces, margins acutely toothed in upper half, teeth and apex callous-tipped; heads sessile or subsessile in axils of stem leaves, from hemispherical to subglobose, about 4 mm. diameter enlarging to 6-7 mm.; involucre obscured by numerous florets; *outer female florets in 6-8 rows*, corolla slender, tubular; disc florets also numerous, bisexual and fertile with pale 4-lobed corollas; achenes slender-clavate, *the brown furrows not reaching the apex and the scanty hairs on the angles with coiled apices*; corollas deciduous, pappus none. Common in low lying ground or swampy areas; widespread in southern and eastern Australia. 'Common Sneezeweed'. Fig. 372.

1. *C. cunninghamii* (DC.) A. Br. et Aschers.

1a. Differing from preceding in *weak prostrate stems*; leaves oblanceolate to obovate or cuneate, about 1 cm. long with shallow teeth in upper half, narrowed below but not clasping, sometimes subopposite; heads sessile or shortly pedunculate, smaller than in preceding species; *female florets in 3-4 rows*; *achenes with furrows reaching to apex, the hairs on the angles lacking coiled apices*. Common in swampy ground especially at lower to intermediate altitudes; widespread in temperate Australia and Tasmania, also Asia and New Zealand. 'Spreading Sneezeweed'.

2. *C. minima* (L.) A. Br. et Aschers.

20. SOLIVA Ruiz et Pavon See Cabrera (1949)

Silky villous annual, with prostrate or spreading stems sometimes less than 5 cm. long or the whole plant up to 20 cm. diameter; leaves pinnatifid with lobes narrow or trilobed, petiole with broad scarious clasping base which may be purplish-red on lower leaves; stem leaves similar but petiole base narrower; heads sessile, axillary but sometimes appearing terminal within clustered leaves; involucre bracts ovate, green and villous; outer florets female, lacking corollas, inner sterile or abortive; achene incurved with rigid terminal spine as long as the body and with broad incurved 2-lobed wings with slender spines at their apices, pubescent on convex face and bases of spines. Of Chilean origin; New South Wales, Victoria, South Australia, and Tasmania (?); naturalised in few places in the environs of Canberra. 'Jo-Jo'. Fig. 373.

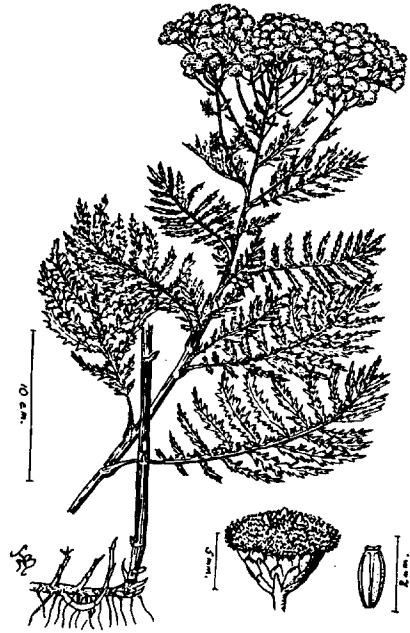
**S. pterosperma* (Juss.) Less.

21. ISOETOPSIS Turcz.

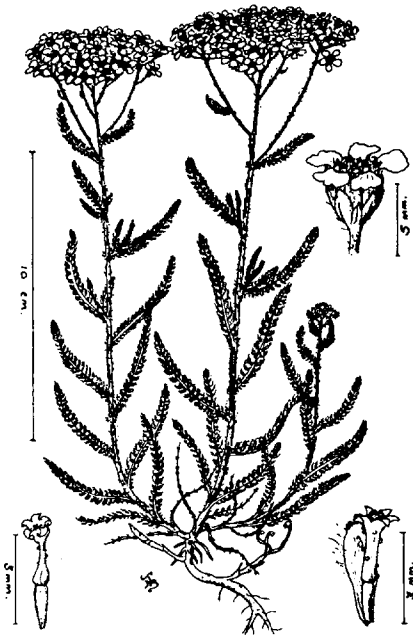
Dwarf tufted annual; leaves slender linear, 1-5 cm. long, their bases broad and scarious; heads sessile within leaf bases, crowded, 4-5 mm. long; involucre bracts thin with scarious



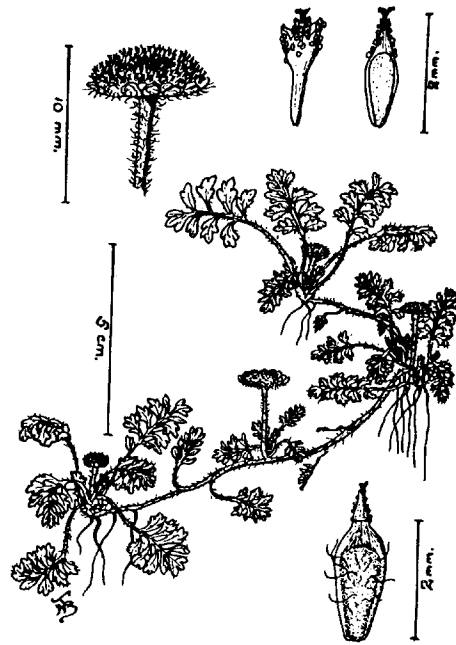
368. *Artemisia vulgaris* var.



369. *Tanacetum vulgare*



370. *Achillea millefolium*



371. *Cotula filicula*

margins; outer florets with slender corollas obliquely split into 4 slender subulate teeth; inner florets sterile, style undivided; achenes turbinate, subangular, sparsely villous, pappus of broad obtuse or acute apiculate scales about as long as achene. Very widespread species found in a wide range of climatic conditions throughout southern and eastern Australia and possibly including several species; A.C.T. plants are commonly less than 2 cm. high, usually found in woodland areas, sometimes colonising bare stony soil. Fig. 374.

I. *graminifolia* Turcz.

Tribe: Senecioneae

22. **SENECIO** L. See *Belcher (1956)*, *Willis (1957)*

1. Outer florets ligulate.

2. Herb to 1 metre high, glabrous or almost so; leaves sessile, narrow lanceolate to elliptical, narrowed to base or larger leaves more or less pandurate with clasping auricles, 5-12 cm. long, 0.5-2.5 cm. wide, acuminate or acute, margins dentate to serrate with projecting callose teeth, flat or recurved; basal leaves withering early; heads in corymbose panicles above reduced leaves; involucre 3.5-4.5 mm. long, a few loose linear bracts on the peduncles; involucral bracts linear with papillose or papillose-ciliate apices; *ligulate florets about 5, disc florets less than 12*; achene slender, 2 mm. long, brown with vertical rows of appressed white papillae; silky pappus about twice as long. Common especially along creeks and roadsides with damp ditches, at almost all levels including subalpine habitats on upper slopes. New South Wales, Victoria, and Tasmania. 'Fireweed Groundsel'.

1. *S. linearifolius* A. Rich.

2a. Ascendent herb to 40 cm. high, sparsely hairy; basal leaves 4-8 cm. long, oblanceolate but narrowed into long slender bases, along the stems leaves becoming more toothed, uppermost commonly pinnatifid with narrow linear lobes and more or less serrate; 1 or 2 pairs of basal lobes often clasping stem; heads in terminal panicle, more or less corymbose at first; bracts subtending branches and around base of involucre ovate with narrow red-brown tips, margins irregular and conspicuously ciliate; involucre 5-6 mm. long, bracts oblanceolate, rigid below, thinner above with scarious margins, apices dark and ciliate; *ligulate florets 11-13, disc florets commonly more than 40*; achenes slender, 3 mm. long, striate with appressed papillose hairs in grooves, pappus about 1½ times as long. In subalpine woodland and forest areas especially where submarginal to sphagnum swamps. A high altitude form of a species widespread in Australia, Tasmania, and New Zealand.

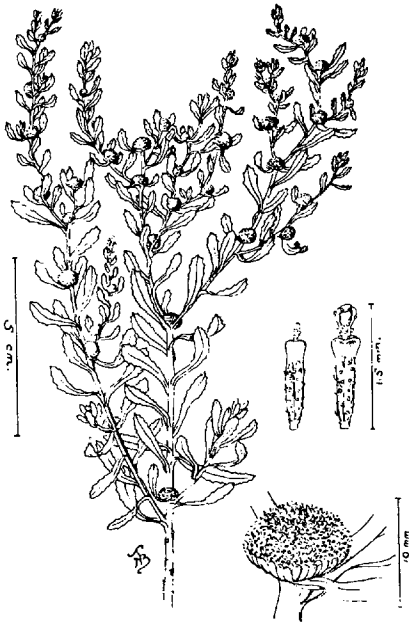
2. *S. lautus* G. Forst. ex Willd.
sens. lat.

1a. All florets tubular.

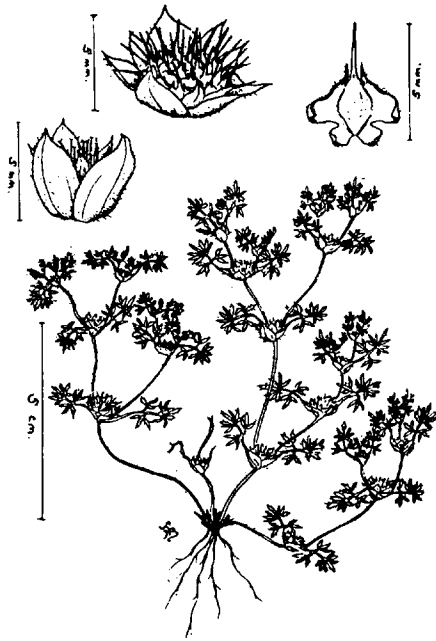
3. Leaves lobed, doubly pinnatisect or pinnatifid, often with toothed stem-clasping auricles; achenes not attenuate towards summit and up to 2 mm. long.

4. Annual or overwintering herb, *stems ascendent to 30 cm. high or less*, sparsely tomentose with cottony hairs; leaves pinnatifid, somewhat lyrate; the *ultimate lobes obtuse and without callose apices*, the sparse hairs more or less restricted to nerves especially on lower surface, margins flat; heads at first subsessile in dense cluster; *involucre 7-9 mm. long*, short outer bracts with conspicuous black apices, longer bracts green with black tips ciliate at apex; florets numerous; achenes about 1.5-2 mm. long, with loosely appressed short papillose hairs in vertical series, pappus about twice as long. Of European origin. Naturalised in some areas of temperate Australia and Tasmania; waste places in the A.C.T.; sometimes found as garden weed or in lawns. 'Groundsel'.

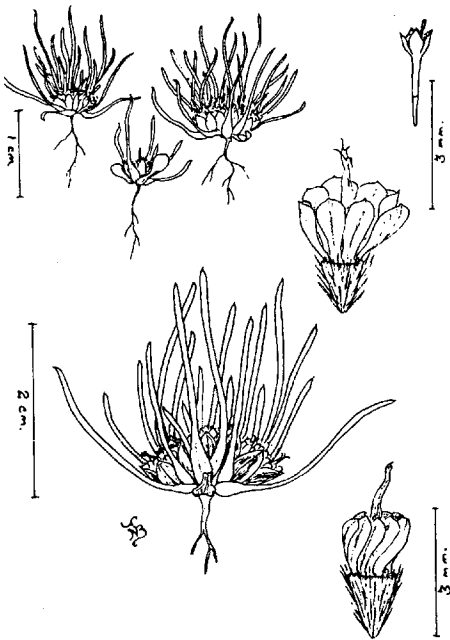
3. **S. vulgaris* L.



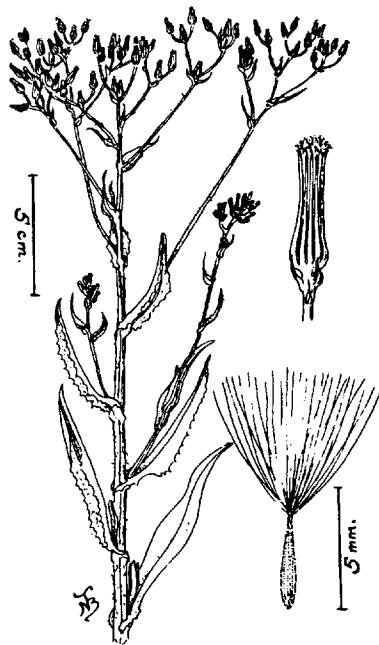
372. *Centipeda cunninghamii*



373. *Soliva pterosperma*



374. *Isoetopsis graminifolia*



375. *Senecio gunnii*

4a. *Erect annuals or short-lived perennials to 1.5 metres high; leaves mostly with 2-toothed stem-clasping auricles and commonly scabrid on upper surface, lobes with callous apices; involucre 4.5-7 mm. long; achenes oblong-cylindrical (rarely fusiform).*

5. Leaves coarsely pinnatifidly lobed, margins denticulate, teeth acute or almost obtuse; heads in loose panicles; bracts 7-9 (rarely 10 or 11 on individual heads), glabrous except for ciliate apices, striate, *tending to twist spirally when seeds are shed*; florets often few and about equal in number to the bracts; achenes 2.5-2.75 mm. long, with short hairs in the grooves. At higher elevations, in swampy areas; also eastern Victoria. A montane form which may merit varietal status.

4. *S. biserratus* Belcher forma

5a. Involucral bracts 11-13, achenes 1.5-2 mm. long (except in form placed with *S. hispidulus* var. *hispidulus*).

6. *Leaves deeply bipinnatisect*, scabrid on upper surface, lobes narrow with acute or acuminate callous-mucronate teeth; heads in corymbose panicles; bracts 4.5-5 mm. long with prominent ribs giving a striate appearance to the involucre and *not twisting when old*; florets more numerous than bracts; achenes clothed with short appressed hairs. At low altitudes, e.g. Molonglo Gorge near Queanbeyan and on Black Mountain; also Western Slopes and Tablelands of New South Wales, Wimmera district of Victoria and in South Australia.

5a. *S. hispidulus* A. Rich. var.
dissectus (Benth.) Belcher

6a. *Leaves linear to lanceolate elliptical* but irregularly lobed or toothed with some larger lobes again toothed; otherwise differing from the preceding in bracts 5-6 mm. long, achenes with short hairs in narrow grooves between flat ribs. Black Mountain; also New South Wales, Victoria, Tasmania, South Australia, and Western Australia. (Among A.C.T. material are some specimens from Vanity's Crossing, Cotter River and from Glendale, Gudgenby River. These differ in having narrower often linear leaves glossy and glabrous on upper surfaces and fusiform achenes 2.75-3 mm. long. They may be undescribed but lie close to *S. hispidulus*.)

5b. *S. hispidulus* A. Rich. var.
hispidulus sens. lat.

Note: A number of high elevation specimens, tentatively referred to *S. gunnii* (see below) were sorted by Belcher, during a visit in December 1967, as more closely related to *S. hispidulus*. The plants are of coarse habit, the leaves entire with revolute margins or toothed, not purplish on undersurface, involucre 8.9 mm. long and at least 3 mm. diameter due to numerous florets, achenes 2.5-3 mm. long but scarcely narrowed above, the hairs in grooves. These plants seem to represent an undescribed taxon.

3a. Leaves simple, entire or with short projecting callous teeth or the lower ones irregularly serrate, rarely with irregular lobing near base, sometimes with a single pair of stem-clasping teeth; achenes narrowed above, more than 2 mm. long, with rows of short hairs between flat ribs.

7. *Perennial herb, stems erect or ascendent from rhizome*, grey with webby tomentum especially when young, later more or less glabrescent; lower leaves obovate or broadly oblanceolate, 5-9 cm. long, narrowed to clasping base, obtuse, commonly purplish on undersurfaces; stem leaves lanceolate to linear, narrow bases more or less clasping, sometimes with single pair of lobes, apex acute or acuminate, margins usually with shallow callose teeth but often revolute and appearing entire; all leaves webby-tomentose when young, upper surfaces later glabrescent and sub-scabrid; heads in loose more or less corymbose panicle; involucre 6-8 mm. long, outer bracts webby tomentose; involucral bracts 9-13, sparsely webby or glabrescent except for minute glandular hairs, apices ciliate; achene

2.5-3 mm. long, fusiform, more or less attenuate above; pappus about twice as long. In the A.C.T. a common species of subalpine forest and woodland, also in forests of upper slopes; New South Wales, Victoria, and Tasmania. 'Mountain Fireweed'. Fig. 375.

6. *S. gunnii* (J. D. Hook.) Belcher

7a. Erect more or less tufted herb, annual or short-lived perennial; webby tomentose or later glabrescent; leaves narrow-linear or linear-lanceolate, 4-15 cm. long, entire or with few teeth which may be hidden in revolute margins, upper leaves with or without clasping basal lobes; heads in large loose panicle, involucre similar to those of preceding species but more often glabrous and rarely less than 7.5 mm. long; achenes 3-4 mm. long, usually much attenuate above and almost beaked, pappus about 1½ times as long. Common in dry sclerophyll habitats and in mountain gullies in the A.C.T.; New South Wales, Victoria, South Australia, Western Australia, Tasmania, New Zealand, and Timor. 'Cotton Fireweed'.

7. *S. quadridentatus* Labill.

23. *ARRHENECHTHITES* Mattf. See Belcher (1956)

Perennial herb, stems reddish-purple, simple or with few branches, with sparse webby hairs; leaves petiolate, coarsely toothed or pinnatifid or lower portion pinnatisect, under-surface reddish-purple; lobes entire or toothed, obtuse or acute; leaves reduced to narrow bracts below inflorescence; heads few in cymose panicle, peduncles slender with few narrow linear bracts; involucre slender, 2-2.5 cm. long, 3-4 mm. diameter; bracts 6-8, narrow linear to linear-lanceolate, about 4-nerved with scarious margins; sparsely papillose-pubescent, woolly ciliolate at apices; outer florets slender, female, split above long narrow tube with minute ligule; inner florets bisexual but functionally male, tubular, fertile achenes fusiform-cylindrical, 6-7 mm. long, 1 mm. diameter, sterile achenes flattened; pappus of numerous fine white bristles about as long as involucre. Rare in the A.C.T., known to occur on western slope of Brindabella Range west of Bendora; also eastern New South Wales and eastern Victoria.

A. mixta (A. Rich.) Belcher

24. *BEDFORDIA* DC.

Shrub or small tree to 4 metres high, branches and undersurfaces of leaves densely and softly tomentose; leaves lanceolate to oblong-elliptical, 10-18 cm. long, 2-4 cm. wide, glabrescent and shining above with reticulate venation, petiole 1-2 cm. long; heads in short panicles in uppermost axils, forming a cluster later over-topped by new shoots; involucre 5-6 mm. long, bracts tomentose except on scarious margins and apex; florets all tubular, bright orange at anthesis but soon fading, longer than involucre; achene more or less flattened, striate, 3-5 mm. long; pappus to twice as long. Common shrub of wet sclerophyll habitats, especially along creeks in gullies at higher elevations; eastern New South Wales, Victoria, and Tasmania. 'Blanket Bush'. Fig. 376.

B. salicina (Labill.) DC.

Tribe: *Arctotideae*

25. *CYMBONOTUS* Cass.

1. Perennial herb; leaves radical, petioles slender with broad clasping bases above which they are ciliate with conspicuous multicellular hairs with thread-like apices (soon deciduous); blades ovate, 5-10 cm. long, 3-6 cm. wide, lobed or almost lyrate, lobes with shallow teeth, undersurface white-tomentose with coarser multicellular hairs on nerves, upper surface scabrid; heads on peduncles usually much shorter than leaves or almost sessile; involucre hemispherical, 7-10 mm. diameter; outer bracts narrower than inner, tomentose on lower two-thirds, spatulate above with glabrous sometimes purplish scarious margins and

recurved subulate apiculum; inner bracts ovate-oblong, obtuse with broad scarious pale margins and apices, tomentose up the centre, with or without golden droplets; outer florets female, ligules yellow, sometimes short; inner florets tubular, bisexual; *achenes* 3 mm. long, straight, glabrous, rugose, brown or black, lateral ridges not forming a fold but the pale semi-translucent base passing into two ridges on inner face without median ridge between. Widespread in dry and wet sclerophyll habitats from lower elevations near Canberra to upper slopes and gullies in the ranges; often common in disturbed habitats and variable in size of plant; eastern New South Wales, Victoria, Tasmania, South Australia, and Western Australia. Fig. 377A-A₃.

1. *C. preissianus* Steetz

1a. Closely resembling preceding, differing in the following characters: tomentum fine and webby owing to very slender hairs whose multicellular nature is not obvious; on undersurfaces of leaves the coarser hairs are less conspicuous and may be absent; spatulate ends of outermost bracts with very narrow glabrous margins; inner very broadly ovate with broad scarious margins and apices; *achenes* 2.5 mm. long, curved, pubescent and almost smooth on convex outer face, lateral ridge forming a fold, short inner face with sunken median ridge between lobed ridges linked in pale slightly flared base. Generally found at lower elevations than the preceding and sometimes persistent in gardens and lawns. Southern Queensland to eastern Victoria. 'Bear's Ear'. Fig. 377B₁-B₃.

2. *C. lawsonianus* Gaudich.

26. *ARCTOTHECA* Wendl.

Annual herb; leaves all radical or along decumbent striate but white-tomentose stems; leaves lyrate-pinnatisect, lobes themselves lobed or pinnatisect, 5-30 cm. long, undersurfaces white-tomentose with webby slightly sticky hairs; upper surfaces becoming scabrid with hair bases; heads on peduncles shorter than or as long as subtending leaf; involucre hemispherical, 10-15 mm. diameter; bracts numerous, imbricate, outermost shortly ovate with subulate apices, woolly with ciliate margins; innermost oblong-obtuse with thin black or purple margins; ligulate florets 1.5-3 cm. long, spreading, golden-yellow with darker veins and blackish tinge on back; disc florets tubular, bisexual; achenes about 2 mm. long, at first densely appressed-villous, later the pinkish hairs spreading and tangled-woolly so that short pappus scales are hidden. Of South African origin, now widely naturalised throughout temperate Australia; a weed of cultivated or waste areas, nature strips, and in pastures; local plants sometimes overwinter. 'Cape Weed'. Fig. 378.

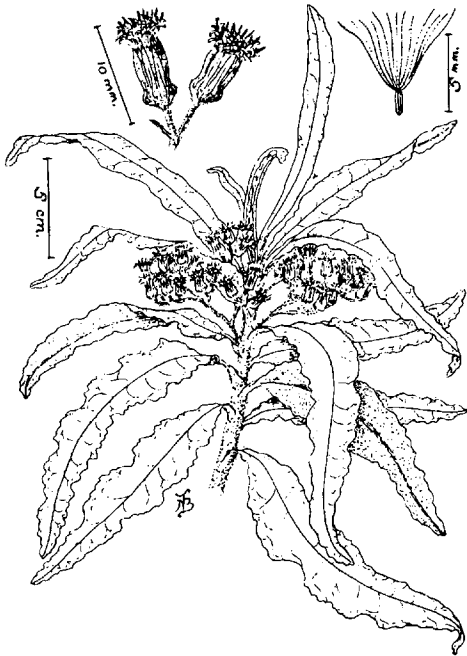
**A. calendula* (L.) Levyns

Tribe: Inuleae

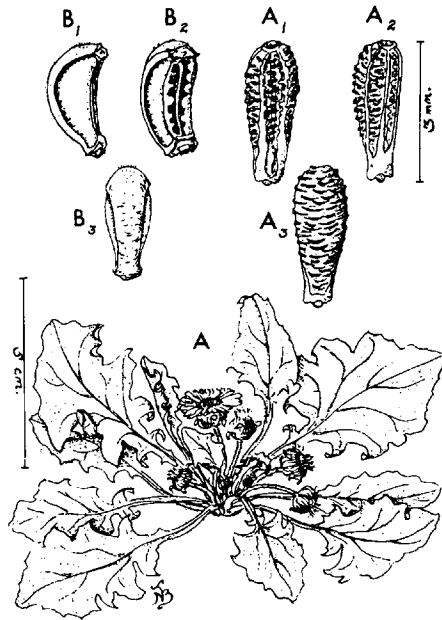
27. *PARANTENNARIA* Beauverd *See Beauverd (1911)*

Dwarf dioecious perennial forming cushion-like mats or low and flat, the prostrate stems rooting at nodes; leaves crowded, lower margins woolly-ciliate, bases scarious and often purplish, blades 7-15 mm. long, concave above, abruptly narrowed to slender apiculum; heads solitary, terminal, fertile (female) more slender than sterile (bisexual) ones, both at first sessile among uppermost leaves, fertile ones later pedunculate; involucre 5 mm. long, bracts scarious, brown or purplish, broadly oblong-elliptical to lanceolate, obtuse or inner ones acute-acuminate; florets tubular; achenes glabrous, pappus barbellate. At high elevations in alpine and subalpine habitats on Kosciusko and in Victorian Alps, collected in cold wet area of gully on slopes of Mt Gingera in A.C.T. Fig. 379.

P. uniceps (F. Muell.) Beauverd



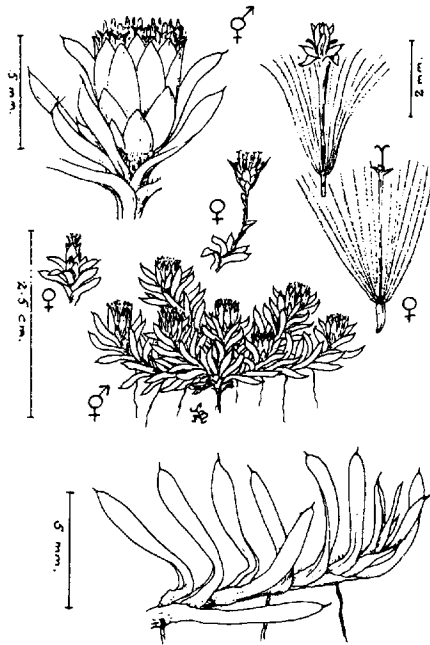
376. *Bedfordia salicina*



377. A. *Cymbonotus preissianus*
B. *Cymbonotus lawsonianus*



378. *Arctotheca calendula*



379. *Parantennaria uniceps*

28. RUTIDOSIS DC.

Perennial herb, sometimes slightly viscid, thick woody butt covered with brown scales of old leaf bases, stems erect, seasonal or twiggy with late or second season shoots from upper axils; leaves linear, sessile, slightly decurrent, 1-5 cm. long, margins closely revolute, upper surface with sunken glands (when dry), later recurved; heads terminal to upper branches (peduncles) bearing short leafy bracts with ragged scarios apices; involucre hemispherical; outermost bracts short, stiffly scarios; intermediate and inner ones with green claws covered with short glandular papillae and stiffly scarios upper part raggedly fringed and acute; florets all tubular and bisexual, orange-yellow; achenes 1.75-2 mm. long, minutely papillose, crowned by stiff pappus of narrow plumose-ciliate scales. In woodland and grassland habitats, e.g. near Canberra; also southern New South Wales, Victoria (basalt plains west of Melbourne). Fig. 380.

R. leptorrhynchoides F. Muell.

29. PODOLEPIS Labill. See Davis (1956)

1. Heads mostly in terminal clusters or corymbs.

2. *Robust* perennial herb to 50 cm. high with numerous basal leaves, *densely webby-tomentose on stems*; lower leaves 10-25 cm. long, obovate or oblanceolate, obtuse or elliptical and acute; midrib broad but not prominent, margins flat or undulate, both surfaces sparsely woolly or glabrescent; stem leaves smaller and narrower, sessile and clasping, more or less erect; heads in dense cluster, peduncles webby-tomentose with small woolly bracts with glabrous scarios laminae like the involucral bracts; *involucre about 2.5 cm. diameter*, hemispherical, bracts loose; outer bracts short with ovate-oblong thinly scarios entire laminae, *intermediate ones with rigid glandular-pubescent claws hidden by the broad but longer scarios laminae*; *outer florets more than 30*, golden-yellow, rather shortly ligulate, spreading, female; disc florets shorter, all tubular, bisexual; achenes 3-4 mm. long, fusiform-terete (angular when dry or immature), minutely papillose above, narrowed to tubular base of the barbellate pappus. Common species of subalpine wooded or grassy habitats, flowering late summer. Though handsome and prolific the clustered heads are often spoilt by insect infestation. Also south-eastern New South Wales and Victoria at high elevations. Fig. 381.

1. **P. robusta** (Maiden et Betche)
J. H. Willis

2a. *Slender* perennial herb usually with single seasonal stem, to 70 cm. high, *sparsely webby hairy or glabrescent except on peduncles*; radical leaves few, elliptical, 10-15 cm. long, narrowed below but the clasping bases persistent on rootstock, with sparse multicellular hairs on both faces, paler underneath, midrib prominent; often withered or dry by flowering time; stem leaves narrow linear, shorter than radicals, margins revolute, apices slender, bases clasping; heads in terminal cluster or forming corymbose panicle; *involucre 1.5-2 cm. diameter*; campanulate; outer bracts with obtuse laminae; *intermediate with exposed broadly linear glandular-pubescent claws longer than their broad obtuse or rounded scarios laminae*; *ligulate florets 20 or less*, 10-15 mm. long, spreading; achene similar to that of preceding but minutely papillose. In forest habitats of upper mountain slopes, generally above 3500 ft; Blue Mountains of New South Wales to Gippsland, Victoria.

2. **P. hieracioides** F. Muell.

1a. Slender perennial herb; stem often simple, sparsely webby-tomentose; radical leaves broadly or narrowly oblanceolate, acute, sparsely or densely hispid with multicellular hairs on both faces or (at higher altitudes) subtomentose; stem leaves linear or lanceolate with clasping bases, margins revolute, midrib prominent underneath; *heads solitary and terminal* (rarely more than one); peduncle with dark-tipped bracts with thin scarios broadly lanceolate acuminate laminae; involucre hemispherical-campanulate, 2.5-3 cm. diameter; outer

bracts passing into those of peduncle; *intermediate bracts to 2 cm. long*, their rigid linear glandular-pubescent claws hidden by the broadly ovate scarious laminae; florets rich orange, ligulate ones more than 30, spreading and deeply 3-5-toothed, disc florets shorter; achene 3-4 mm. long, minutely papillose, narrowed to tubular base of barbellate pappus. Handsome species owing to colour of ligules, found in woodland and dry forest areas at lower altitudes (e.g. near Canberra) and also on mountain slopes to above 5000 ft; Queensland to Tasmania and South Australia.

3. *P. jaceoides* (Sims) Voss

30. LEPTORHYNCHOS Less.

1. Ascendent perennial herb with slender stems to 30 cm. high; radical and lower leaves soon withering, bases of stem leaves adpressed, leaves linear, oblanceolate or elliptical, upper part of stem forming slender peduncle to solitary terminal head and bearing adpressed bracts; involucre 8-10 mm. diameter, campanulate, *bracts long-ciliate* with brown tips, florets all tubular and longer than involucre, outer ones recurved; achene slender, *narrowed above but not beaked*, *pappus bristles flattened at base*, barbellate. The species extends from south-eastern Queensland to Tasmania and South Australia. Local material separates into lowland and montane forms but this distinction is less clearly defined in material from a wider area. In the lowland form the stems arise from a *thickened rootstock* and often have axillary shoots in the upper axils, the *stems and leaves bear long tubercle-based hairs*, the bracts of the peduncle have membranous laminae 4-5 mm. long while the *involucral bracts have dark brown acuminate apices with white cilia*. This is common in dry sclerophyll habitats or in grassland. It appears to represent *L. hemisphaericus* DC. which is usually treated as a synonym. The montane form agrees more closely with the type of *L. squamatus* from Tasmania. The stems arise from a *thin rhizome* and are adpressed tomentose, upper surfaces of leaves commonly dark green, *undersurfaces densely white tomentose*, bracts of the peduncle tomentose with membranous laminae 2-3 mm. long, *involucral bracts woolly ciliate, the acute or obtuse apices light brown with cilia of the same colour*. It is found in damp or swampy habitats at high elevations. 'Hairy Buttons'. Fig. 382 (lowland form).

1. *L. squamatus* (Labill.) Less.

1a. Perennial herb with simple or few-branched stems to 60 cm. high from slender rootstock; *stems with sparse multicellular hairs or glabrescent; leaves hispid with similar hairs*; lower leaves broadly oblanceolate, 3-5 cm. long, obtuse with narrow callose apex, *not withering early*; stem leaves oblong to linear, 2-5 cm. long, margins revolute, bases adpressed and somewhat decurrent; heads solitary, terminal on bracteate peduncle shorter than leafy part of stem; lower bracts passing into leaves, upper with oval green base and thin scarious acuminate laminae to twice as long (3-5 mm.); upper part of peduncle glandular-pubescent; involucre 1.5-2 cm. diameter, outer involucral bracts with short bases and acuminate scarious *laminae minutely toothed on margins, inner bracts with rigid linear or linear-spathulate glandular-pubescent claws narrowed above to the slender scarious but short laminae*; florets longer than involucre, corollas glandular-pubescent; achene 5 mm. long, more or less papillose, *narrowed above in slender beak*, pappus bristles not flattened at their bases. Not common in the A.C.T., has been collected in Canberra area and near Yaouk Gap; also New South Wales, Victoria, South Australia, and Tasmania. 'Scaly Buttons'.

2. *L. elongatus* DC.

31. HELIPTERUM DC. See Wilson (1960)

1. *Annual herb, stems ascendent, rarely more than 10 cm. high and often less than 2 cm.*, villous with fine long hairs; leaves linear-oblong to oblanceolate, 10-15 mm. long, acute or obtuse, margins slightly recurved or revolute towards clasping bases, villous with long fine hairs or glabrescent; heads terminal but finally in a cymose spike, sessile in cluster of leaves; involucre 4-5 mm. long, bracts shining scarious, acuminate, long ciliate, innermost with

stiff green or purplish glandular-pubescent centre, *all without spreading laminae*; florets tubular, slightly longer than involucre and *recurved*; achene fusiform, 1.5 mm. long, glabrous, plumose pappus bristles linear-acuminate, shortly united at base. Common in grassland and woodland habitats at lower elevations; widespread in southern and eastern Australia.

1. **H. australe** (A. Gray) Druce

1a. Perennials; inner involucre bracts with spreading white laminae.

2. *Stems woody at base* and bearing dry leaves of old growth; stems and leaves clothed with *webby or woolly tomentum*; heads on long leafless peduncles; inner involucre bracts with *slender, rigid glandular-pubescent claws*; achene curved, smooth to verrucose. 'Hoary Sunray' (see varieties below).

2. **H. albicans** (A. Cunn.) DC.
sens. lat.

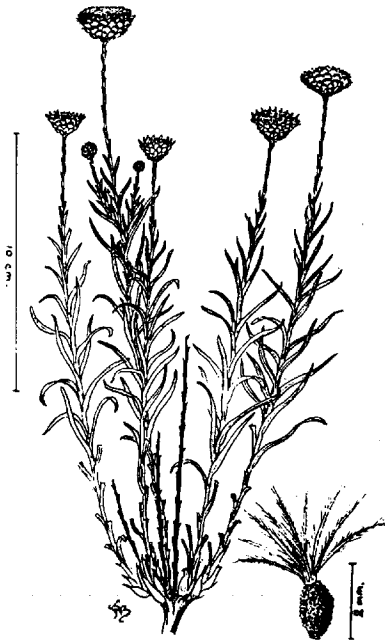
3. *Leaves webby-tomentose, narrow linear, closely revolute*, 2-8 cm. long, about 1 mm. thick, lower with callose apices, upper with acuminate scarious appendages but passing into scattered bracts of peduncle which is longer than current season's part of leafy stem; heads solitary, terminal, *to 3.5 cm. diameter*, hemispherical but shape varying (after rain bracts erect, when dry spreading or laminae reflexed); outer involucre bracts milky-white tinged with purple, midrib purple, *ovate-lanceolate, acuminate*; inner bracts with rigid almost terete claws and spreading elliptical milky-white lamina woolly ciliate at base; flowers yellow; achene 2 mm. long, pappus bristles slender with thickened apices. In dry sclerophyll woodland at lower elevations; New South Wales and Western Victoria. Fig. 383.

2a. **H. albicans** var. **incanum** (W. J. Hook.) P. G. Wilson forma
purpureo-album (F. Muell.) P. G. Wilson

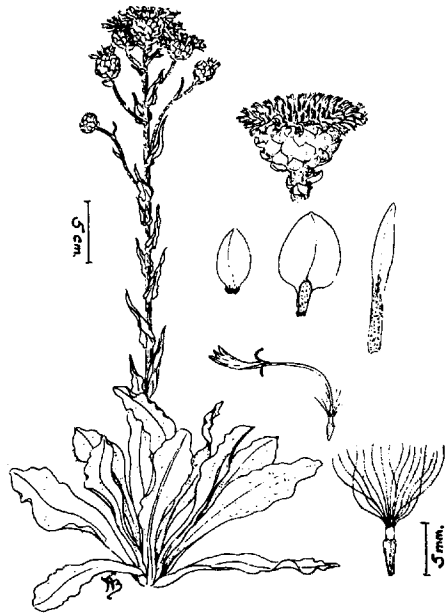
3a. Stems shorter than in above and, like the leaves, softly and *densely woolly tomentose*; *leaves elliptical to narrow oblanceolate*, 2-5 cm. long, narrowed to slender base, margin flat or recurved, upper leaves lacking scarious apices and changing abruptly to small distant bracts of the long peduncle; heads 2-3 cm. diameter; outer involucre bracts *broadly lanceolate, obtuse or acute, white, minutely scabridulous*, intermediate bracts purplish and scabridulous on exposed parts of ovate obtuse or acute laminae which are woolly ciliate and abruptly narrowed at base above slender claw; inner bracts with white, ovate lanceolate spreading laminae; achene as in preceding. At high elevations in exposed grassland or woodland habitats; south-eastern New South Wales and north-eastern Victoria.

2b. **H. albicans** subsp. **alpinum** (F. Muell.) P. G. Wilson

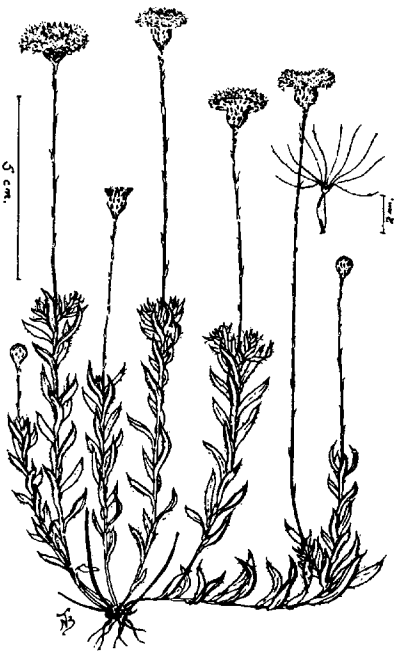
2a. *Perennial herb*; stems simple, erect, numerous, glabrous below but glandular-pubescent and more or less woolly hairy below involucre; leaves linear or linear-elliptical, 0.7-1.5 cm. long, *surface conspicuously glandular-punctate, margins appearing denticulate* owing to alternating pits and raised short stout hairs; heads solitary and terminal; *involucre compactly hemispherical*, 6-8 mm. diameter, outer bracts scarious, straw-colour with purple midrib, not or few passing on to top of peduncle, broadly ovate, obtuse, woolly ciliate; *intermediate bracts with broad scarious ciliate claws* with purple midrib and oblong rounded-obtuse reflexed laminae; inner bracts with conspicuous milky-white spreading laminae 7-8 mm. long, concave and plicate above; achene obovoid, 3 mm. long, *densely villous*, plumose pappus bristles subulate and more or less tufted at their apices. Common at higher elevations in subalpine habitats or on exposed slopes especially after fire or disturbance. There is also a form with more slender habit, shorter leaves and smaller heads with less hemispherical involucre occurring in the Molonglo Gorge. Local plants appear to belong to **H. punctatum**



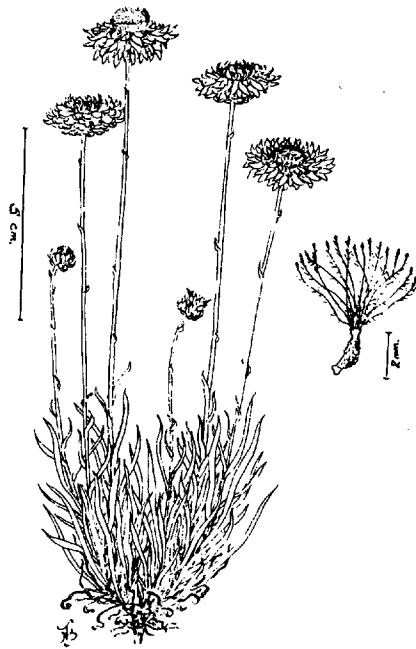
380. *Rutidosis leptorhynchoides*



381. *Podolepis robusta*



382. *Leptorhynchus squamatus*



383. *Helipterum albicans* var.

DC. (which is usually treated as a synonym). Widespread both geographically and climatically in eastern Australia and Tasmania. 'Camomile Sunray'.

3. **H. anthemoides** (Sieb. ex Spreng.) DC.

32. **HELICHRYSUM** Mill. See *Burbidge (1958)*

1. Perennial herbs or subshrubs; radiating laminae of involucre bracts or the bracts themselves yellow or golden-brown.

2. Involucre bracts stiff and glossy, the larger of the inner ones more than 3 mm. (to 8 mm.) wide.

3. *Ascending rhizomatous herb; stems unbranched*, webby-tomentose on young parts and peduncles, the hairs with coarse bases persistent on older parts; lower leaves broadly oblanceolate, 6-10 cm. long, 1.5-2 cm. wide, obtuse or acute, bases clasping; upper leaves narrower, grading into narrow linear leafy bracts on the peduncle; heads terminal, solitary, to 5 cm. diameter; *involucre bracts minutely scabridulous*, imbricate, outer ones golden-brown or orange, acute to shortly acuminate, *inner golden-yellow and acuminate*; florets numerous in cylindrical tuft standing up from spreading bracts; achene 2 mm. long, golden pappus bristles slightly tufted at their apices. Common at high elevations, in the more open habitats of subalpine woodland above 4000 ft; south-eastern New South Wales, eastern Victoria, and Tasmania. 'Alpine Everlasting'.

1. **H. acuminatum** DC.

Note: A specimen from Blackfellow's Gap (south of Mt Gingera) with habit of the above has stems and leaves more scabrid and woolly tomentum is almost absent. The stems branch and the involucre bracts are obtuse-apiculate though scabridulous towards their apices. Possibly a hybrid between **H. acuminatum** and **H. viscosum**.

3a. Erect short-lived perennial, stiff stems branching above; late or second season laterals often have small leaves; viscid and minutely scabrid; leaves narrow linear to elliptical, 3-9 cm. long on primary stems; at least the upper and those of secondary shoots with revolute margins; heads terminal to upper branches; involucre hemispherical; outer bracts with ovate-oblong, *obtuse-apiculate laminae*, often brownish, claw short, woolly; *intermediate with broad oblong obtuse laminae*; inner with lanceolate laminae, golden-yellow; *all laminae smooth and shining*; florets numerous, forming tuft projecting above bracts; achenes 2 mm. long, pappus of yellow barbellate bristles not tufted above. Summer flowering species of dry sclerophyll habitats, also found on slopes at high elevations. New South Wales. 'Golden Everlasting'. Fig. 384.

2. **H. viscosum** Sieb. ex Spreng.

2a. Involucre bracts not rigid or highly glossy.

4. Involucre bracts not golden ciliate; heads solitary and terminal; involucre shallow and flat-based.

5. Perennial herb, sometimes short-lived; stems erect, woolly-tomentose or glabrescent near base; leaves linear-elliptical, acuminate, 3-8 cm. long, 5-8 mm. wide but narrower when margins revolute, clasping at base; upper surface sparsely scabrid or glabrous; under-surface sparsely villous-tomentose, the hairs long with coarse bases or short and glandular, later glabrescent; upper leaves grading into leafy bracts on peduncle; involucre shallow, spreading bracts all with a *rigid linear glandular-pubescent claw below a broadly lanceolate acuminate minutely denticulate lamina*, inner to 12 mm. long but innermost shorter; *florets very numerous, in a dense cluster prominent above the spreading involucre bracts*; achene 1.5-2 mm. long, glabrous; pappus bristles barbellate, not thickened at apices. Laminae of involucre bracts are a characteristic golden-brown to tan-brown in colour. Not common

in the A.C.T. but grows on Black Mountain; also Queensland to south-east of New South Wales.

3. *H. collinum* DC.

5a. Perennial herb with erect ascendent or decumbent stems, woolly tomentose; basal leaves broadly oblanceolate, stem leaves narrower or elliptical to linear grading to bracts of peduncle, margins flat or recurved, apices apiculate but scarious on bracts; heads terminal, solitary; *involucre broad, flat or saucer-shaped*; outer bracts brown to orange, inner pale or yellow; florets numerous but *not set high within the spreading involucre*; achene glabrous, bristles very slender, barbellate, slightly thickened apically. Very widespread species represented locally by distinct lowland and montane forms. The *lowland form* has thinly cottony tomentum on the stems, leaves 5-10 cm. long with surfaces scabrid due to bases left by deciduous hair apices, involucre 2.5-3 cm. diameter, outer bracts pale brown or straw-coloured and all about as long as the intermediate ones which have crumpled laminae and slender acuminate apices. This form grows in dry sclerophyll habitats, e.g. on slopes of Black Mountain. In the *montane form* the branched ascendent stems are densely webby tomentose, leaves 1-3 cm. long, densely tomentose on undersurfaces and scabrid on upper, involucre 2-2.5 cm. diameter, outer bracts orange-brown, shorter than but grading into intermediate ones which have laminae crumpled near the obtuse ragged apices. It is common in mountain forests and on slopes at high elevations. The species is widespread in eastern New South Wales, Victoria, Tasmania, and South Australia.

4. *H. scorpioides* Labill.

4a. Involucral bracts conspicuously ciliate; heads in terminal clusters or corymbs. (In most specimens the distinction, used below, between plants with ascendent stems and plants with several erect stiff branches will be found satisfactory but they represent the local forms of a species complex distributed throughout southern Australia and some specimens may prove to be intermediate.)

6. *Low ascendent perennial herb, commonly less than 20 cm. high*, stems and both surfaces of leaves with dense webby tomentum; *leaves oblanceolate*, 2-5 cm. long, margins flat or recurved, with glabrous subulate apiculum which lengthens to pale scarious appendage on uppermost (bract) leaves; heads at first in *dense cluster of 5-8* subtended by few leafy bracts, peduncles later lengthening to a few millimetres; involucre 5-6 mm. long, 4-5 mm. diameter (or less); *outer bracts erect though loose*, orange or orange-brown; lanceolate, acute, long ciliate on margins with yellow hairs which are also present on outer face, woolly towards base; inner bracts slightly longer, on slender claws, golden-yellow, more acuminate but *not recurved*; florets numerous; achenes glabrous or papillose above, bristles subplumose towards apices, the thickened yellow tips conspicuous in the head. Common in all grassy habitats and in open woodland sites; widespread throughout southern and eastern Australia and Tasmania but highly variable. 'Yellow Buttons'.

5. *H. apiculatum* (Labill.) D. Don. sens. lat.

6a. *Perennial herb or subshrub with erect rigid stems to 60 cm. high*, stems with loose villous tomentum but later glabrescent, often purplish; leaves of young shoots (from butt) linear or linear lanceolate, to 5 cm. long, 1-2 mm. wide, leaves on axillary shoots or on secondary late season growth linear or oblong and commonly less than 1 cm. long, giving distinctive *dimorphic appearance* especially on older plants and along flowering primary shoots; leaves woolly tomentose but less so on upper surface, *margins revolute* except on longer ones towards base, apices with subulate apiculum or, on upper leaf bracts, a slender scarious appendage; *heads corymbose, often more than 20 in the cluster*; involucre as in preceding but more compactly campanulate, bracts similar also but *all golden-yellow with spreading recurved apices* and more woolly at the base; achene papillose above, pappus as in preceding. Usually

in dry forest habitats, more common at lower elevations but found over a wide altitudinal range; widespread in eastern and south-eastern Australia and Tasmania. 'Yellow Buttons', 'Clustered Everlasting'.

6. **H. semipapposum** (Labill.) DC.

1a. Shrubs to 2 metres high; heads in corymbose clusters which are numerous along or at ends of branches; inner involucre bracts with spreading white laminae.

7. Leaves spreading; laminae of inner involucre bracts 1.5 mm. or longer.

8. Diffuse shrub to 2 metres high, branches and undersurfaces of leaves with close-set flat greenish-yellow tomentum and somewhat resinous; stems glabrescent later; *leaves lanceolate to elliptical, 4-8 cm. long, 8-15 mm. wide, 3-nerved at base, upper surface dark green, resinous, villous with more or less appressed hairs*; heads 6-15 in terminal corymbs, peduncles tomentose; involucre hemispherical, 5-6 mm. diameter (without spreading laminae); outer bracts with obtuse white radiating *laminae 3-3.5 mm. long*, claws woolly above, florets more than 50; achenes papillose, bristles thickened apically. In wet sclerophyll habitats above 4000 ft or in subalpine habitats; south-eastern New South Wales and Victoria.

7. **H. stirlingii** F. Muell.

8a. Leaves narrow and mostly less than 3 cm. long, 1-nerved.

9. Outer involucre bracts scarious without thickened whitish apices; laminae of inner bracts oblong-orbicular with rounded sometimes torn apices.

10. Shrub 1.5-2 metres high; stems pale between the decurrent angles below the leaves; *leaves narrow linear, 1.5-3 cm. long, 1-2 mm. wide, slightly resinous and glabrous above or with few hairs if young; undersurface pale with closely appressed tomentum except on midrib and recurved margins; upper branches highly floriferous with numerous clusters of heads on short lateral branchlets*; involucre about 2 mm. diameter (without spreading laminae), 4-5 mm. long; outer bracts pale or brownish, shining, scarious, very sparsely woolly; inner with spreading white laminae (back sometimes flushed with red), 1.5-2 mm. long; *florets 10-16*; achenes papillose-hairy, bristles thickened at apices. A handsome shrub but the heads break up soon after flowering or when dried. Common in the Naas-Gudgenby area and the Upper Cotter; found in shrub communities of forest habitats; south-eastern New South Wales, Victoria, and Tasmania.

8. **H. thyrsoides** (DC.) J. H.

Willis et P. F.
Morris

10a. Shrub similar to above but often of more compact habit, *branches densely and softly tomentose*, especially when young, not glabrescent; *leaves oblong to narrow oblanceolate, 8-15 mm. long (usually under 10 mm.), villous-tomentose on upper surface with hairs diverging from midrib, softly and densely tomentose on undersurface including midrib*; upper branches floriferous as in preceding species; involucre similar; florets 15-20; achenes as in preceding. A species of higher elevations than **H. thyrsoides** has been collected on slopes below Mt Bimberi. It is strongly odoriferous when crushed. Distributed from Blue Mountains, New South Wales to south-eastern Victoria.

9. **H. secundiflorum** N. A. Wakefield

9a. Shrub above 1.5 metres high; branches densely but not softly tomentose, tomentum persistent but less coherent with resin on older branches; leaves linear to narrow elliptical or narrow lanceolate, 1-2.5 cm. long, 1.5-2 mm. wide, upper surface with villous tomentum divergent from midrib when young or later glabrescent; *corymbs terminal to upper branchlets, not forming floriferous sprays along them*; involucre 1.5 mm. diameter (excluding the

laminae), 3-4 mm. long, almost all the bracts with white or thickened apices; inner bracts with white laminae 2 mm. long, more or less ovate and obtusely acuminate; florets about 16; achenes papillose hairy, bristles thickened at apices. Not common in the A.C.T. but has been collected in the Black Mountain area; eastern New South Wales and Victoria.

10. *H. conditum* N. A. Wakefield

7a. Compact shrub to 1 metre high, branches densely and softly tomentose when young but on branchlets the tomentum hidden by closely adpressed leaves 1-3 mm. long, ovate, obtuse but the revolute margins concealing the tomentose undersurface, upper surface (exposed on margins) glistening with yellow resin which obscures sparse hairs at least when young; involucre subsessile in subglobose clusters terminal to upper branchlets, about 1 mm. diameter, 3.5-4 mm. long; inner bracts with orbicular irregularly crenate laminae less than 1 mm. long; florets 2-4; achene minutely papillose-pubescent, bristles thickened at apices. Highly inflammable shrub marginal to water courses in sphagnum swamps at high elevations; south-eastern New South Wales, Victoria, and Tasmania. 'Kerosene Bush'.

11. *H. hookeri* (Sond.) Druce

33. *INULA* L.

Aromatic annual to 60 cm. high, stems erect with spreading branches, viscid with glandular hairs and also broad-based hairs with filamentous apices; leaves linear or narrow oblanceolate, hairy like stems, margins ciliate, recurved or revolute, to 7 cm. long but smaller above and on lateral shoots; involucre 4.5-6 mm. long, on very short laterals arranged in a large pyramidal leafy panicle; outer bracts green, narrow elliptical-lanceolate, glandular-pubescent with few long hairs, apex ciliate; inner bracts little longer with pale margins; outer florets shortly ligulate, about as long as involucre, sometimes reddish, disc florets yellow; achene pubescent, narrowed below barbellate pappus bristles. Weed of waste ground appearing in late summer, liable to cause dermatitis and sometimes poisonous to stock, also taints milk. Of Mediterranean origin, widely naturalised in settled districts throughout temperate Australia and Tasmania. 'Stinkwort'. Fig. 385.

**I. graveolens* (L.) Desf.

34. *CASSINIA* R.Br. See Wakefield (1951a)

1. Heads in corymbs.

2. Involucral bracts milky-white at least in the upper half (sometimes pinkish); corymbs large, often compound due to aggregation of corymbs from several leafy branches with the terminal one, 10-20 cm. diameter.

3. Bushy shrub to 2 metres high, branches grey, woolly-tomentose above glandular hairs (obscured on young growth); leaves on flowering shoots narrow-elliptical, acuminate, 6-10 cm. long, 2-5 mm. wide; at base of shoots (i.e. on winter growth) leaves less than 4 cm. long, 1 mm. wide with more revolute margins; upper surface dark green with sparse villous hairs, viscid but not scabrid; lower white-tomentose, prominent midrib glandular-pubescent; corymbs to 20 cm. diameter even without aggregation; involucre 3.5-4 mm. long, 1.5 mm. diameter, except short outermost ones all milky-white and rounded obtuse; achene less than 1 mm. long, sparsely papillose; bristles minutely barbellate with clavate apices. Common in dry sclerophyll forest habitats especially following disturbance; New South Wales, Victoria, and Tasmania. 'Cauliflower Bush'. Fig. 386.

1. *C. longifolia* R.Br.

3a. Bushy shrub to 2 metres high, branches with glandular hairs projecting through low tomentum; leaves from narrow linear-elliptical (3-5 cm. long with recurved margins) to very narrow linear (1-2.5 cm. long with closely revolute margins), apices reflexed; upper surface scabrid, lower (when visible) sparsely tomentose with coarser hairs on prominent midrib; corymbs often aggregated to more than 10 cm. diameter; involucre about 4 mm. long,

1.5-2 mm. diameter, *outer bracts with shining transparent bases and milky-white apices* (sometimes tinged with pink); achene papillose-hairy, bristles slightly flattened, barbellate but *not clavate*. Common shrub of woodland and forest habitats in the A.C.T., to about 4000 ft. Like the preceding its growth is increased by disturbance; also New South Wales to Tasmania, rare in South Australia.

2. *C. aculeata* (Labill.) R.Br.

2a. Shrub less than 1 metre high, stems with stiff glandular hairs, tomentum absent or almost so except on branches of corymb; leaves narrow linear, 1-3 cm. long, margins closely revolute, apex reflexed; upper surface slightly resinous, *minutely scabridulous* or almost glabrous; undersurface usually thinly tomentose and with minute glandular hairs; *corymbs 3-8 cm. diameter, terminal to simple branches* (on which leaves subtend very short leafy shoots); involucre about 4 mm. long, 1.5 mm. diameter or less; *bracts shining, scarious, the inner 2 or 3 with narrow white truncate apices*; achene glabrous, bristles slender, barbellate, not clavate. At high elevations, rare in the A.C.T. but has been collected at Murray's Gap; from south-eastern Queensland to Victoria (also South Australia as *C. complanata* J. M. Black?) but local form more common in the Kosciusko area and Victorian Alps.

3. *C. uncata* A. Cunn. ex DC.

Note: *C. adunca* F. Muell. has been collected near Lake George and may occur in the A.C.T. It has a habit like the above but the involucral bracts are in vertical rows, the innermost white with emarginate apices.

1a. Heads in loose pyramidal panicles.

4. Diffuse shrub to 2 metres high, *branches slightly resinous but apparently glabrous* (except on short lateral shoots and panicle branches); *leaves 3-6 cm. long, to 1 mm. wide*, margins revolute, apex recurved; upper surface glabrous but resinous, undersurface tomentose except on *conspicuous midrib*; heads numerous in *loose spreading panicle*, to 15 cm. long or more and almost as wide; involucre 2.5-3 mm. long, 1.5 mm. diameter; *bracts shining, transparent with white apices*; inner ones glandular-pubescent on covered bases; achene papillose-hairy, bristles flattened, shortly coherent at base, *clavate at apices*. Dry sclerophyll habitats at lower elevations, panicle greenish-yellow when fresh; eastern New South Wales.

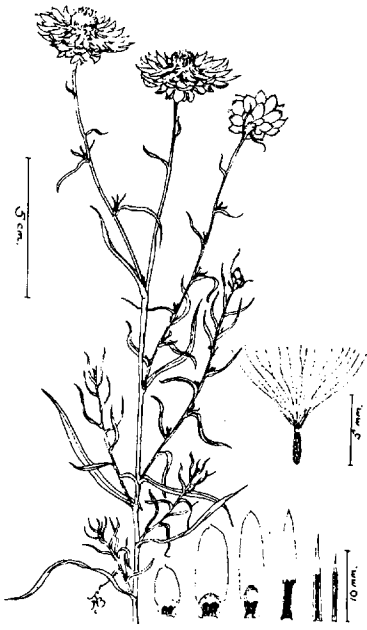
4. *C. quinquefaria* R.Br.

4a. Shrub with long slender branches; *stems tomentose*, the glandular hairs sparse and short; *leaves mostly about 1 cm. long, 0.5 mm. wide*, often less than 5 mm. long on shorter axillary shoots, margins closely revolute, *midrib not visible*; panicles compound to 30 cm. or more long with leafy branches ending in slender individual panicles; involucre about 3 mm. long, *bracts scarious, outer ones brownish, inner purplish; florets dark red*; achene papillose-hairy, *bristles not clavate*. Dry sclerophyll habitats, e.g. Black Mountain but apparently not common in the A.C.T.; New South Wales, Victoria, and South Australia. 'Chinese Shrub'.

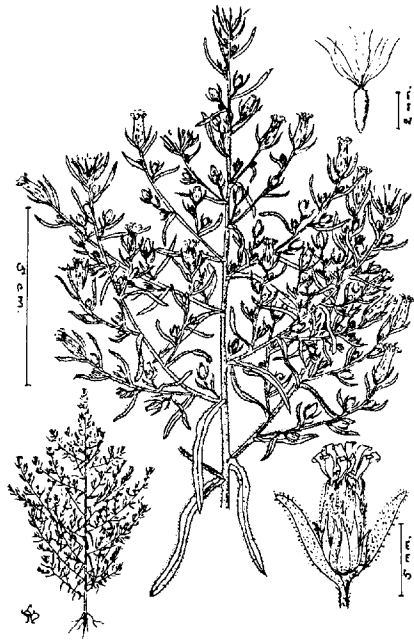
5. *C. arcuata* R.Br.

35. STUARTINA Sond. See Philipson (1937)

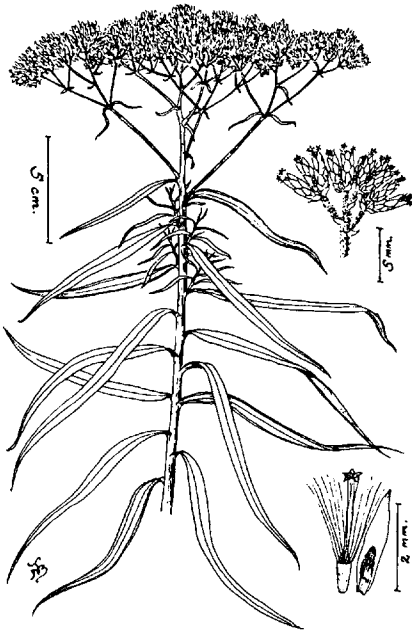
1. Ascendent annual woolly-villous herb to 15 cm. high; leaves 1-2 cm. long, spatulate with undulate obovate or orbicular laminae on slender bases at least as long, stem clasping, upper surface sparsely and undersurface densely woolly; heads small, sessile, compound with numerous involucre in a cluster of floral leaves axillary to a stem leaf or apparently terminal; each involucre enveloped in wool, outer bracts short and broad, inner 2 or 3 longer with glabrous rigid *dark-coloured recurved apices* longer than the few florets; achene obovoid, minutely papillose, pappus lacking. Dry habitats in pasture, woodland or open



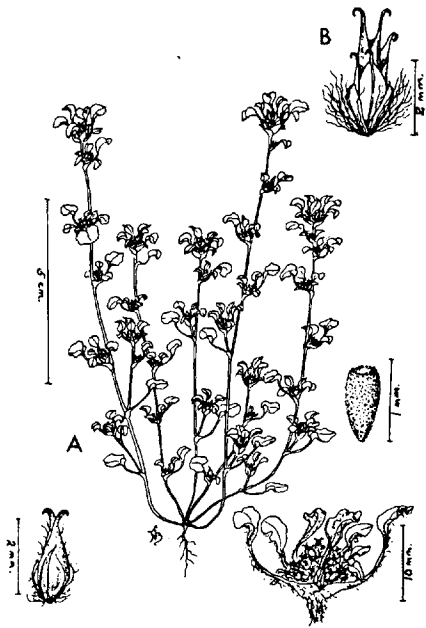
384. *Helichrysum viscosum*



385. *Inula graveolens*



386. *Cassinia longifolia*



387. A. *Stuartina muelleri*
B. *Stuartina hamata*

forest; New South Wales, Victoria, South Australia and Western Australia. Fig. 387A and details.

1. *S. muelleri* Sond.

1a. Similar to preceding but plants usually smaller and less than 10 cm. high; *commonly with a head close to base of plant* which may be reduced to this with its subtending leaves; heads similar but *inner bracts of involucre pale with apparently subulate strongly hooked apices* more conspicuously exerted above the woolly tomentum. Similar habitats but less common; New South Wales. Fig. 387B (involucre only).

2. *S. hamata* W. R. Philipson

36. GNAPHALIUM L.

1. Heads in a dense terminal compound head *or* in globose clusters terminal to or along leafless upper parts of stems; pappus bristles ciliate at base, sometimes slightly coherent at base but soon breaking apart.

2. Heads all or mostly in a terminal head subtended by floral leaves with broad bases; leaves green, sparsely hairy or glabrous on upper surface.

3. *Tufted annual or biennial herb* to 60 cm. high with one to several erect or ascendent stems lanate with long hairs lying parallel to axis of stem and often matted together; lower leaves spatulate to almost linear, 3.5-7 cm. long with slender base broadened and stem-clasping, base often undulate on margins which are recurved or revolute above; apex obtuse with *conspicuous subulate apiculum*; lower surface lanate with hairs less parallel than on stems; upper leaves similar but smaller, linear with revolute margins; *compound head compact, often solitary, subtended by more than four floral leaves much longer than head*; involucre numerous, 3-4 times as long as broad, on short tomentose pedicel; inner bracts longer and narrower than outer; florets reddish-purple, outer female and very slender, inner one or two broader; achene sparsely and minutely papillose. A weed of gardens and disturbed ground; widespread in Australia and also in New Zealand. Fig. 388.

1. *G. involucratum* G. Forst.

3a. *Stoloniferous perennial herb*, usually with radical leaf cluster and one or several erect stems to 50 cm. high, lanate with soft tomentum sometimes parallel to axis as in preceding; basal leaves spatulate to oblanceolate, 4-7 cm. long, not much broadened or clasping at base which is not undulate on margins; apex acute or obtuse with *very short blunt apiculum*; upper leaves similar but grading into elliptical or linear shape, margins revolute or leaf concave below; upper surfaces sparsely villous to glabrescent; lower with soft dense tomentum, hairs tending to lie parallel longitudinally; *compound heads loose*, at first terminal and solitary but on well-grown plants *also with heads sessile in axils of reduced upper leaves; subtending floral leaves not projecting or with less than 3 longer than involucre*; involucre about twice as long as broad, inner bracts not much longer than outer; florets reddish, outer female ones numerous, inner about 3-4; achene as in preceding species; involucral bracts strongly reflexed when old. Woodland areas near Canberra and also extending to upper slopes of mountains; widespread in many parts of Australia and Tasmania; Asia. 'Japanese Cudweed'.

2. *G. japonicum* Thunb.

2a. Perennial (or biennial?) herb with ascendent stems; *woolly tomentose*, hairs looser than in two preceding but sometimes lying parallel; lower leaves oblanceolate, 2-5 cm. long, apex obtuse but with minute callose apex usually hidden by tomentum of both surfaces; stem leaves smaller, grading into linear-lanceolate, bases clasping, *uppermost with slender acuminate scarious apices* (at base of inflorescence); involucre in more or less globose clusters or short spikes of 4-8 along leafless upper stem or at first more closely clustered and subcorymbose, not much longer than broad; bracts shining scarious, sometimes yellowish;

outer florets numerous, slender, sometimes pink or reddish, inner florets 4-10, broader; achenes similar to those of preceding, bracts spreading when dry. Cosmopolitan species found in dry woodland habitats and also in forests on mountain slopes; widespread in Australia. 'Jersey Cudweed'.

3. *G. luteo-album* L.

1a. Heads in spicate or globose clusters, forming a narrow spicate or racemose panicle; pappus bristles glabrous at base but coherent in a ring and remaining so after pappus falls from achene.

4. Annual (or biennial) ascendent herb to 20 cm. high; stems and leaves (both surfaces) woolly with *hairs forming loose net of tomentum above the surface*; leaves broad to narrow oblanceolate, the lower 3-4 cm. long the upper smaller and narrower, apices obtuse with glabrous apiculum protruding through tomentum; leaves often more or less undulate or loosely conduplicate and recurved above; involucre 3-3.5 mm. long, sessile or subsessile, sparsely villous at base, *in small clusters in upper axils and terminal*, lateral clusters subtended by few reduced leaves and sometimes forming a short lateral spike; involucral bracts shining; outer shorter with narrow, inrolled apices but sometimes recurved; *inner ones obtuse*, often reddish; florets purplish-red, outer female ones very slender, inner bisexual and few; achenes minutely and sparsely papillose with minute crown of papillae at base of pappus; involucral bracts spreading when dry or returning to erect position and appearing pointed. Disturbed areas in woodland and dry forest habitats and waste areas at lower altitudes in the A.C.T.; of American origin.

4. **G. calviceps* Fernald

4a. Perennial (or biennial?) herb with a number of stems from a rhizome or rootstock; *stems and undersurfaces of leaves with close-set tomentum of long hairs either matted together longitudinally or in undulate folds*; *upper surface green with sparse hairs*; lower leaves spatulate (sometimes broadly so), 2-7 cm. long, obtuse or rounded at apex with subulate apiculum, *3-nerved in lower part of blade*, base more or less clasping; upper leaves smaller and narrower, 1-3 cm. long, often undulate on margins; inflorescence similar to that of preceding species but involucre 4-4.5 mm. long and *inner bracts acute* (becoming inrolled-acuminate); achene similar to that of preceding but sometimes purple. In waste areas and disturbed habitats, sometimes persistent in lawns and gardens. Cosmopolitan, widespread in Australia to which it is probably an introduction. 'Purplish Cudweed'.

5. **G. purpureum* L.

37. CALOCEPHALUS R.Br.

Perennial tufted herb to 40 cm. high, hoary with close webby tomentum; leaves mostly opposite to subopposite, linear, obtuse or acute, 3-nerved but outer nerves submarginal or resembling recurved margins, lowest leaves to 6 cm. long, stem leaves 1-1.5 cm. long, uppermost 5-8 mm. and adpressed to slender peduncle; head compound, oblong-cylindrical, or the smaller heads globose, not subtended by involucre of bracts, 5-12 mm. long, 7-8 mm. diameter (mature), pale yellow later bright yellow when flowering; individual involucre (partial heads) minute, tightly compacted, bracts cuneate-oblanceolate, margins membranous around thickened centre; upper part yellow and spreading in flower, outer ones with pale woolly hairs; florets 2-3; achene papillose, bristles 4-5, plumose at apices, flattened below, coherent at base. Grassland or open woodland habitats in the A.C.T.; New South Wales, Victoria, Tasmania, and South Australia. 'Lemon Beauty-head'. Fig. 389.

C. citreus Less.

38. CRASPEDIA G. Forst.

Note: All the local forms have been referred to *C. uniflora* Forst. by some authors. This was based on a New Zealand plant with cottony white hairs on the leaf margins. In our plants

this character is never well-developed though on leaves of some forms cottony filaments of the hispid hairs may persist.

1. Perennial herb with one or more erect flowering stems 25-60 cm. high; lower leaves in rosette or near bases of stems, from broadly to narrowly oblanceolate, obtuse or acute, narrowed into slender base up to twice as long as 3-nerved blade; fibrous vascular bundles of bases persistent around butt; stem leaves lanceolate or linear with clasping bases; uppermost smaller and distant along slender peduncle; *compound head less than 2.5 cm. diameter*, at first hemispherical, later globose; *bracts subtending the individual partial heads with well-developed scarious glabrous margins*; achenes obovoid-turbinate, appressed-villous, pappus bristles plumose, shortly coherent at base. The local material can be separated into lowland and montane forms. At lower elevations the stems are slightly woolly-villous but later glabrescent; leaves hispid, to 30 cm. long when growing among dense grass tufts, their bases often reddish; glandular hairs present on upper stem bracts but peduncles glabrous or sparsely woolly below head 1.25-1.75 cm. in diameter; bracts subtending partial heads broadly ovate, often dark coloured above, scarious and glabrous except for the short midrib which is glandular-pubescent; achenes 1.5 mm. long, pappus 2 mm. Common in grassland, woodland, and open forest habitats. In the montane form the plant butt is often surrounded by fibres from old leaves, stems are hispid and bear glandular hairs especially below the heads which are 1.75-2.5 cm. diameter; bracts of partial heads ovate or ovate-lanceolate with broad green glandular-pubescent centre, their scarious margins turning brown; achene 2 mm. long with pappus 4 mm. Common in forest or subalpine communities on higher mountain slopes. The Australian distribution for these particular forms cannot be given with certainty. 'Billy Buttons'. Fig. 390 (lowland form).

1. *C. glauca* (Labill.) Spreng.

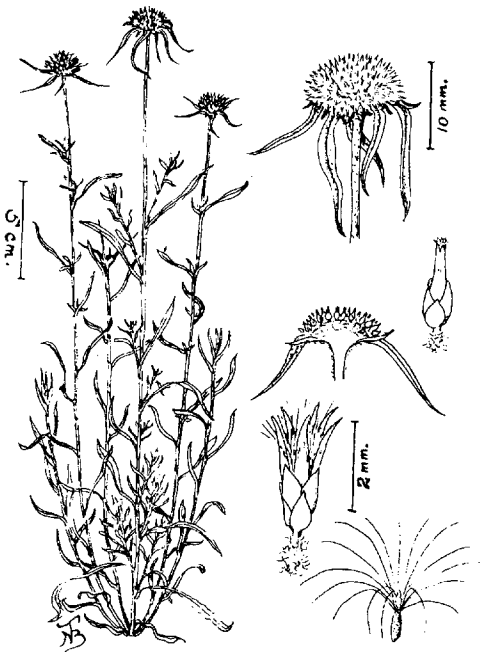
1a. Robust perennial herb, flowering stems 40-70 cm. high; obovate to oblanceolate blades of radical and lower leaves 1.5-3 cm. wide and 3-nerved, slender bases as long or longer, the whole leaf to 15 cm. long, with scattered glandular hairs and sparsely hispid on both surfaces but the *margins slightly woolly due to persistence of filamentous apices of hairs*; lower stem leaves narrow lanceolate or narrow oblong-lanceolate, 7-10 cm. long, uppermost ovate with broad clasping bases and reduced to 1 cm. long; *peduncle robust, 2-3 mm. diameter*, with sparse webby hairs above minute glandular pubescence; *compound heads 3-4 cm. diameter, pedicels of partial heads densely webby-tomentose; bracts subtending partial heads broadly lanceolate, glandular-hispid, the narrow scarious margins more or less ciliate with glandular hairs; achene 2-2.5 mm. long, plumose bristles 5-6 mm. long*. In damp grassy habitats or woodland at high elevations.

2. *C. macrocephala* W. J. Hook.
vel aff.

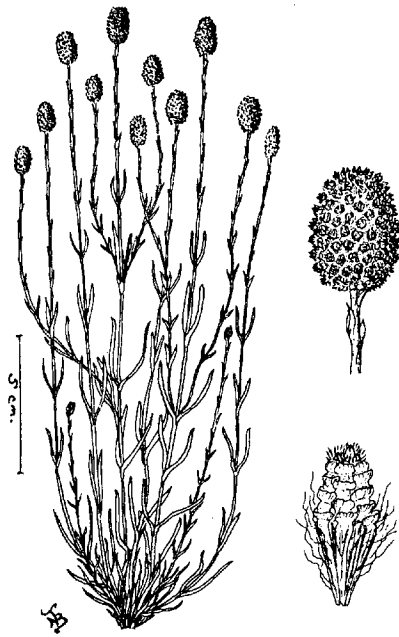
Tribe: Cynareae

39. CIRSIUM Mill.

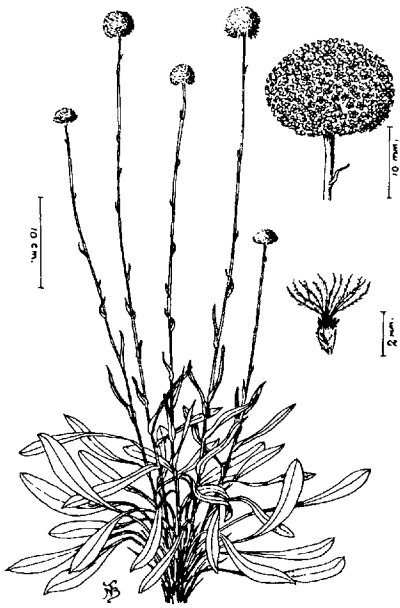
Biennial herb with erect spinose-winged stem to 1.5 metres high and branched above; basal leaves large, ovate lanceolate in outline, pinnatifid with spinose lobes; stem leaves to 15 cm. long, pinnatifid, the segments each with erect and deflexed lobes, all lobes acuminate with an apical spine; upper surface strigose with spiny hairs; lower cottony with webby tomentum; heads terminal to main and upper branches, broadly ovoid (loosely spreading when dry or over-mature) 3-5 cm. in diameter with tuft of purple-red florets protruding above, subtended by a few reduced leaves; bracts cottony webby with pale lanceolate bases and long slender subulate spreading apices, green below, pale spinose above; achene 3.5-4 mm. long, pale streaked with black, with prominent ring at summit after the plumose pappus bristles with their basal ring have fallen. Native to Europe, western Asia, and North



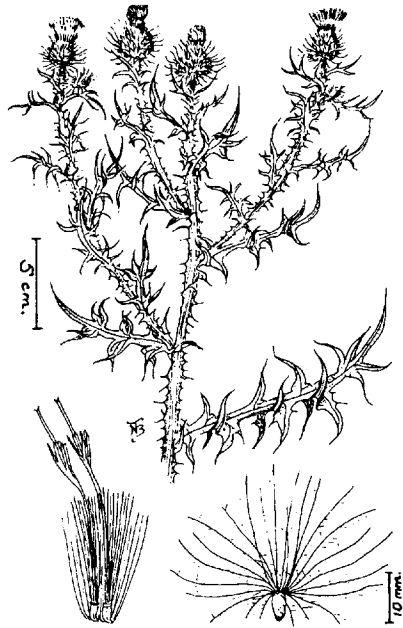
388. *Gnaphalium involucratum*



389. *Calocephalus citreus*



390. *Craspedia glauca*



391. *Cirsium vulgare*

Africa, widespread in southern and eastern Australia; in the A.C.T. a common weed of pastures and disturbed or cultivated ground. 'Spear Thistle'. Fig. 391.

**C. vulgare* (Savi) Ten.

40. *CARDUUS* L. See Kazmi (1964)

1. Annual or biennial herb 40-100 cm. high, stems striate, irregularly spinose-winged, cottony with webby tomentum or later glabrescent; leaves pinnatifid, the spinose lobes erect or deflexed, upper surface sparsely webby; lower with white webby tomentum; upper leaves distant on the slender stems; heads in terminal clusters of 3-4, 2 cm. long, 1 cm. diameter; involucre bracts in several rows with ragged tomentum about their bases; outer bracts broadly lanceolate-acuminate, intermediate green with pale margins or sometimes coloured, with yellow papillae below but scabrid on prominent midrib and margins towards spinose apex; inner bracts elliptical-lanceolate, less spinose at apex and midrib less prominent, *the tips minutely antrorsely scabrid on the backs and margins*, as long as or shorter than reddish-purple florets; achene about 4.5-5.0 mm. long oblong-cylindrical, pale and striate, commonly with minute transverse wrinkling, summit with prominent tubercle; pappus of numerous long scabrid bristles coherent at base in very short ring. Of European origin, widely naturalised in temperate Australia; a weed of waste ground and pastures in the A.C.T. 'Slender Thistle'. Fig. 392.

1. **C. pycnocephalus* L.

1a. Differing from above in coarser habit with well-developed spinose wings extending to summit of the less webby stems; leaves pinnatifid, lobes commonly more shallow than portion along midrib; upper surface sparsely hispid and webby; lower with loose but not dense tomentum; upper leaves extending nearly to summit of stem; smaller heads more numerous and in denser clusters than in preceding, about 1.5 cm. long, 1 cm. diameter; bracts similar to those of above, the innermost with very slender apices longer than the reddish-purple florets and often similar in colour *the tips not scabrid except on margins*; achene about 3.5-4 mm. long. Of similar origin to preceding species and found in similar habitats throughout Australia and Tasmania. 'Slender Thistle'.

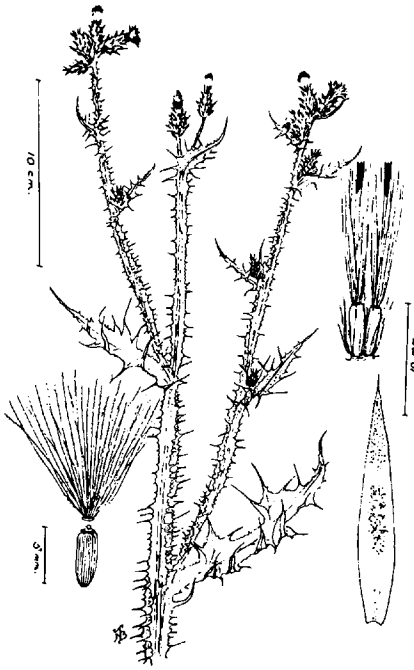
2. **C. tenuiflorus* Curt.

41. *ONOPORDUM* L. See Dress (1966)

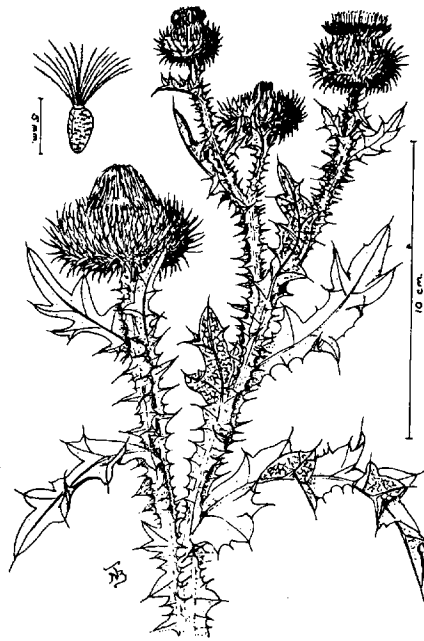
1. Biennial herb, 40-150 cm. high, stems with broad decurrent spinose wings; webby tomentum on stems and both surfaces of reticulately-veined leaves; lower leaves oblong with broad decurrent bases, undulate and irregularly spinose on margins; upper leaves pinnatifid, lobes undulate and irregularly spinose on margins; *leaves forming an acute angle with stem*; heads terminal to main and upper branches (giving candelabrum effect); involucre 3-4 cm. diameter (excluding spines of bracts), *bracts with thick lanceolate bases narrowed to subulate spreading or reflexed spines 2-3 times as long, margin scabrid in double series*; florets very numerous, reddish-purple, conspicuously longer than involucre; achene obovoid but slightly flattened, 4-5 mm. long, mottled grey, transversely rugose. Of European origin but widely naturalised in temperate Australia and Tasmania; a weed of waste ground and pastures in the A.C.T. Known as 'Scotch Thistle' but doubtfully native to British Isles. Fig. 393.

1. **O. acanthium* L.

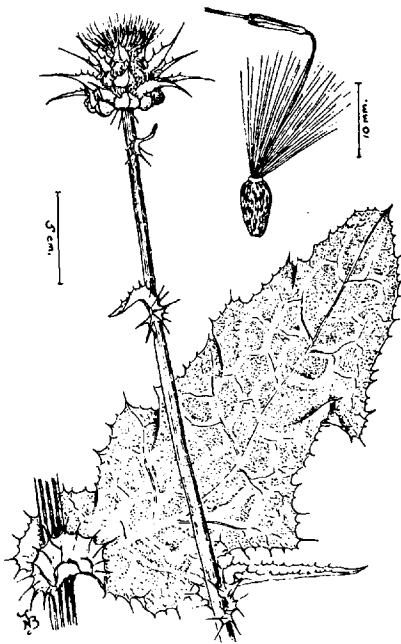
1a. Biennial herb similar to the above but up to 2.5 metres high; *leaves similar but spreading at right angles to stems*; heads about 5 cm. diameter (excluding points of bracts), *involucre bracts elliptical-lanceolate, acuminate, commonly purplish on one or both surfaces, slightly webby or minutely 1-seriate scabrid on margins*, spreading or reflexed from about the middle and with apical spine; florets very numerous, reddish-purple, longer than involucre; achene 5-6 mm. long. Of Mediterranean origin, found in similar sites to preceding. 'Illyrian Thistle'.



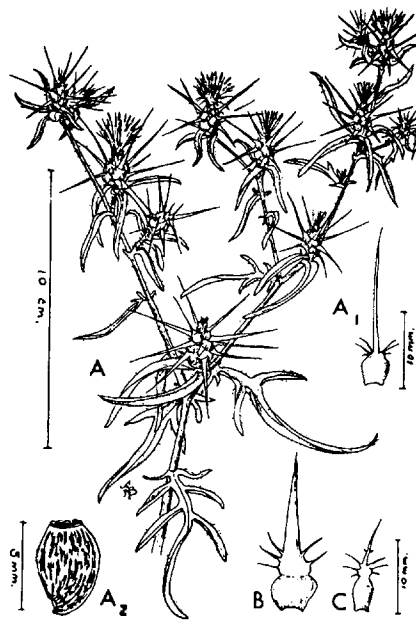
392. *Carduus pycnocephalus*



393. *Onopordum acanthium*



394. *Silybum marianum*



395. A. *Centaurea solstitialis*
 B. *Centaurea calcitrapa*
 C. *Centaurea melitensis*

(Included here are variants, some given specific status overseas, believed to result from hybridisation with *O. acanthium*.)

2. **O. illyricum* L.

42. *SILYBUM* Adans.

Robust annual or biennial herb, flowering stems 1-3 metres high; radical and lower stem leaves oblong, to 50 cm. long, glabrous with conspicuous white markings along nerves of upper surface, margins undulate, sinuate or pinnatifid, spinose; upper leaves small with stem-clasping auricles spinose-ciliate on their margins; uppermost distant and much reduced; heads solitary, terminal, 4-5 cm. diameter; outer bracts concave around base; intermediate with broadly lanceolate-oblong pale claws and green ovate-acuminate spreading laminae spinose on margins and apically; innermost bracts narrow, scabrid on back with smaller laminae; florets numerous, purple, outer ones bent out with upper part erect; achene obovoid, 6.5-7.5 mm. long, pale mottled or streaked with black, summit with pale slightly oblique ring, pappus about twice as long. Common in damp disturbed areas or waste ground or near creeks and rivers. If eaten by hungry stock may cause nitrite poisoning. Of European origin but widely naturalised in temperate Australia and Tasmania. 'Variegated Thistle'. Fig. 394.

**S. marianum* (L.) Gaertn.

43. *CENTAUREA* L.

1. Erect annual herb to 60 cm., stems striate with sparse crisped hairs; lower leaves pinnatifid with narrow lobes below a slender terminal lobe; lobes acute-mucronate, sparse crisped hairs and sunken glands on both surfaces; uppermost leaves entire, linear; heads subtended by few small leaves, *shortly pedunculate among cymose branches*; involucre glabrous, slender, 15 mm. long, 8-10 mm. diameter, ovoid; outer bracts short, intermediate with broadly ovate pale green bases with scarious margins, topped by rigid divaricate pale spines to 2 cm. long which are pinnately spinose at base; *florets reddish-purple*; achene flattened-obovoid, obliquely attached to receptacle, pale with or without brown streaky mottling; *pappus lacking*. Native to Europe, western Asia, and North Africa, widely naturalised in temperate Australia and Tasmania. In the A.C.T. a weed of pastures and of cultivated or waste ground. 'Star Thistle'. Fig. 395B (bract).

1. **C. calcitrapa* L.

1a. Florets yellow, leaves decurrent, pappus present at least on central achenes.

2. Annual herb to 60 cm. high; stems striate, strigose, and sparsely woolly; basal leaves pinnatifid, obtuse; stem leaves decurrent but *wings not continuous from node to node*, oblong-linear, entire or with few shallow teeth, strigose on both surfaces, glandular; heads towards ends of branches, *terminal and on short branches from upper axils or the apical ones paired or subclustered*, subtended by small leaves; involucre shortly ovoid, about 10 mm. long, 8-10 mm. diameter; bracts sparsely tomentose, *upper part not longer than base and pinnately spinose marginally for its lower half, spines reddish*; florets glandular; achene flattened-obovoid, brownish with pale striations, sparsely hairy, pappus bristles of uneven length, longest equal to achene; in similar sites to the preceding and of similar origin. 'Maltese Cockspur'. Fig. 395C (bract.)

2. **C. melitensis* L.

2a. Annual herb to 60 cm. high, branching low on stems which are woolly though not densely tomentose and *conspicuously winged with scabrid margins*; basal leaves pinnatifid; stem leaves with few teeth or entire, linear-lanceolate, acute or acuminate, mucronate; uppermost about 1 cm. long; webby-tomentose with scabrid margins like the stems; heads solitary, terminal to slender upper branches; involucre 10-15 mm. long, 7-10 mm. diameter; bracts

sparsely woolly towards base; outer ones short and broad with 3-5 *digitate spines* about as long as spreading apical spine; intermediate bracts with broad horny bases and a *robust divaricate spreading spine* 1.5-2.5 mm. long which has 2 pairs of small spines on either side at base; innermost bracts longer than intermediate, upper part with short *digitate spines* and conspicuous scarious lateral wings; florets not glandular, conspicuously longer than involucre; tube with dark veins; achene flattened obovoid, central ones pale or mottled with pappus of uneven bristles with longest $1\frac{1}{2}$ times length of achene; marginal achenes dark brown without pappus. Native to southern Europe and western Asia, like the above widely naturalised in Australia and Tasmania; occurrence in the A.C.T. similar to above. 'St Barnaby's Thistle'. Fig. 395A-A₂.

3. **C. solstitialis* L.

44. *CARTHAMUS* L. See Hanelt (1963)

Erect annual herb to 60 cm. high, stems pale brown with sparse crisped hairs with filamentous apices, also minute glandular hairs; leaves pinnatifid, more or less conduplicate and recurved, sessile, clasping; lobes acuminate with apical spines, margins with small scattered spines; sparsely hairy especially on prominent nerves of undersurface; heads solitary at ends of corymbose upper branches; involucre 2.2-5 cm. long, webby-tomentose towards base; outer and intermediate bracts with pale hard bases but otherwise similar to leaves; innermost bracts scarious towards apex with small spines on either side of longer terminal spine; florets yellow, longer than involucre, recurved; achene brown, obliquely attached, 4-angled, almost as broad as long; pappus of linear ciliate scales of uneven length. Of Mediterranean origin, widely naturalised in temperate Australia and Tasmania; in the A.C.T. a weed of crops, pastures, and waste ground. 'Saffron Thistle'. Fig. 396.

**C. lanatus* L.

Tribe: Cichorieae

45. *CICHORIUM* L.

Perennial herb with stout taproot, stems striate, branched, to 1.5 metres high, scabrid with glandular hairs or glabrescent; basal leaves runcinate-pinnatifid or toothed, hairs as on stems, margins scabrid; stem leaves lanceolate or broadly oblong, stem clasping; uppermost forming leafy bracts below branches of panicle; heads solitary on swollen hollow pedicels or in sessile clusters in the axils of such pedicels or along the branches; involucre 10-12 mm. long, outer bracts broadly ovate with pale hard bases but spreading and green above, margins ciliate; inner bracts 2-3 times as long, oblong lanceolate, green, hairy and ciliate at apices; all florets ligulate, bright or pale blue (withered by midday), anthers and style darker; achenes angular, brown with dark mottling, pappus of minute fringed scales. Native to Europe, western Asia and North Africa, widely naturalised in temperate Australia and Tasmania; uncommon in the A.C.T. 'Chicory'. The root, roasted and ground, is sometimes mixed into coffee. Fig. 397.

**C. intybus* L.

46. *MICROSERIS* D. Don

Perennial herb, roots tuberous; leaves radical, linear to narrow oblanceolate, 8-20 cm. long, entire or toothed or pinnatifid with narrow linear lobes, glabrous or scabrid only on margins; heads solitary, peduncles longer than leaves (to 50 cm. long); involucre glabrous, 1-2 cm. long; bracts in two rows, inner about 2-3 times longer than outer, lanceolate with pale margins; florets bright yellow, outer ones twice as long as involucre; achene slender, striate, 8-10 mm. long, pappus of linear scales terminating in barbellate bristles, as long as or slightly longer than achene. Widespread in temperate Australia, Tasmania and New Zealand; in the A.C.T. it is common in subalpine habitats and sparsely distributed at lower

altitudes, flowering in January-February. 'Murrnong', 'Yam', 'Native Dandelion'. Fig. 398.

M. scapigera (Sol. ex A. Cunn.)
Sch.-Bip.

47. **TOLPIS** Adans.

Slender erect annual herb, leaves mostly in basal rosette, withering early; radical leaves oblanceolate to elliptical, 3-10 cm. long, obtuse or acute, narrowed below, margin serrate or with minute callous teeth; stem leaves smaller, elliptical to linear, entire or undulate, uppermost subtending branches of cymose panicle; all hispid and commonly woolly in axils; peduncle swollen and hollow below head, sparsely tomentose with loose subulate bracts 5-10 mm. long passing into others surrounding the involucre which is 4-6 mm. long; bracts lanceolate-acuminate, sparsely tomentose or glabrescent; florets ligulate, outer longer and pale yellow, inner short and purple-brown; achene dark brown, angular-striate; marginal ones minutely pubescent with crown of minute pale scales; disc achenes glabrous, pappus with 4-5 of the scales elongated into slender barbellate bristles twice as long as achene. Of Mediterranean origin, occasionally forming communities in pasture on shallow soil, often undersized in the A.C.T.; naturalised in Tasmania and some parts of temperate Australia. 'Yellow Hawkweed'. Fig. 399.

***T. umbellata** Bertol.

48. **TARAXACUM** Weber ex Wiggers

1. Perennial herb, leaves radical, runcinate-pinnatifid, sparsely hispid or glabrous, 12-25 cm. long, *margins irregularly denticulate*; scapes with solitary terminal heads, glabrous or with sparse hairs towards summit; involucre 15-20 mm. long; *outer involucre bracts reflexed*, lanceolate, more or less ciliate; inner involucre bracts erect, linear-lanceolate, apices narrowly truncate, minutely papillose on back and margins; florets golden-yellow, numerous; *achene about 4-4.5 mm. long, oblanceolate, striate and muricate-spinulose in upper half* with narrow cusp below slender beak 2-3 times as long as achene and bearing very slender barbellate bristles. An aggregate apomictic species of European origin showing great variation in its native habitats but relatively constant locally. Widely naturalised in temperate Australia and Tasmania; in the A.C.T. a common weed of lawns, cultivated ground, and disturbed or waste areas. 'Dandelion'. Fig. 400.

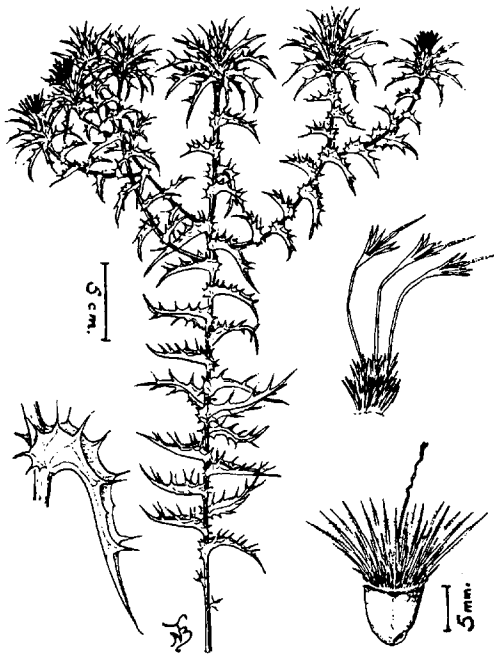
1. ***T. officinale** Weber ex Wiggers

1a. Native perennial herb, leaves radical, narrow linear-oblanceolate to linear-lanceolate, obtuse, the *lobes round-obtuse and entire*; scapes to twice as long as leaves when in fruit; outer involucre bracts adpressed, ovate, narrowed to obtuse apex, margins pale; inner bracts about 3 times as long; achene reddish-brown, 3 mm. long (excluding apical cusp), broadened and spinulose above the middle, more or less tuberculate below; beak 7-8 mm. long. Based on a specimen from Mt Gingera but no specimen examined by present author. Marklund (1964) considers this to be a native species belonging to the sub-Antarctic **T. magellanicum** group.

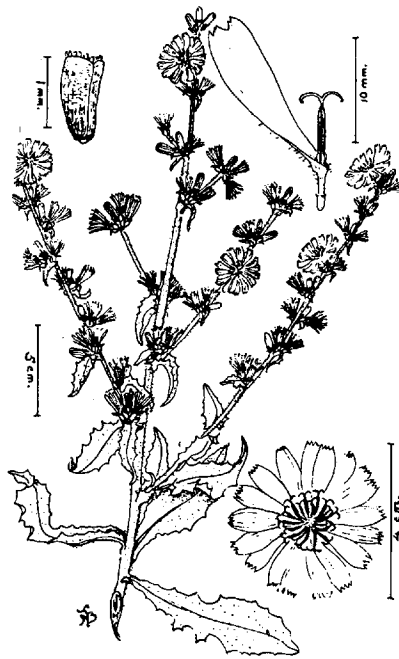
2. **T. aristum** G. Hagl. et Markl.

49. **SONCHUS** L. *See Boulos (1960)*

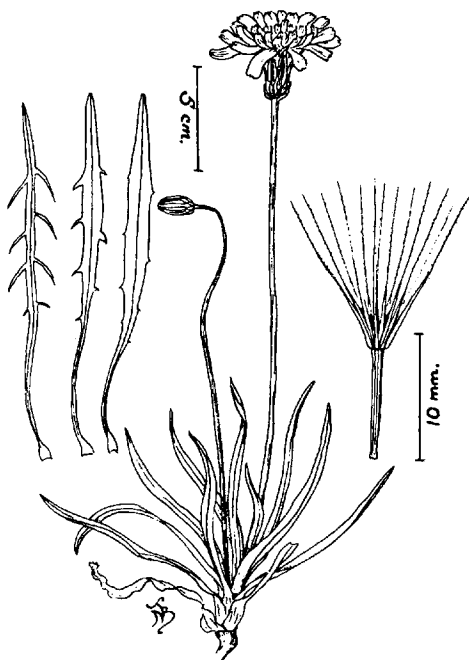
1. Erect annual or overwintering herb, glabrous or with sparse hairs on stems and leaves; leaves alternate, lyrate-pinnatifid, often runcinate, lobes broad or narrow but *terminal lobe wider than those below it*; margins serrate-denticulate, obtuse or acute; base with *acute appressed auricles*; upper leaves smaller, lanceolate or linear with spreading auricles, forming bracts below branches of corymbose panicle; involucre 10-12 mm. long, woolly tomentose at base when young; florets yellow or pale yellow; achene oblanceolate in outline, brown, striate, the *ribs rugose*; pappus bristles numerous, very fine and silky. Native to Europe, Asia, and North Africa but now almost cosmopolitan; naturalised throughout



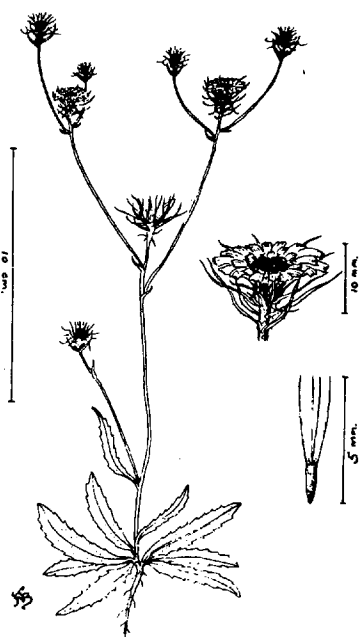
396. *Carthamus lanatus*



397. *Cichorium intybus*



398. *Microseris scapigera*



399. *Tolpis umbellata*

temperate Australia and Tasmania; in the A.C.T. a common weed of gardens, cultivated or waste ground. 'Common Sow-thistle'. Fig. 401.

1. **S. oleraceus* L.

1a. Similar to but more robust than above; *terminal lobe of the leaves not wider than upper laterals, margins spinose-ciliate, base of leaf broadened into rounded appressed auricles*; peduncles commonly with projecting dark glandular hairs; florets golden-yellow; *achene glabrous, flattened, obovate-oblong, more or less winged with 3 smooth ribs on each face*, pappus as in above. Distribution similar. 'Rough Sow-thistle'.

2. **S. asper* (L.) Hill

50. *LACTUCA* L. See Lindquist (1960)

1. Erect annual or overwintering herb, 1.5-3 metres high, stem simple, tough, glabrous but *with numerous projecting prickles on leafy portion*, smooth on branches of the spreading panicle; *leaves held vertically*, pinnately lobed, lobes curved down towards base, appearing more or less hooked, with spreading auricles at base, *margins spinose-ciliate and irregularly toothed*, with prickles along midrib of lower surface; bracts subtending panicle branches small, *ovate-sagittate with conspicuous obtuse or rounded auricles*; heads on small bracteate branchlets in a panicle; involucre 7-10 mm. long, narrow cylindrical; bracts imbricate, purplish above, minutely papillose-rough; *florets pale yellow not darkening on drying*; achene flattened, elliptical-oblong, striate, ribs scabrid below but with short bristles above; beak slender, 1-1½ times as long as achene; pappus of silky barbellate bristles about as long as beak. Native to southern Europe, North Africa and western Asia; common weed of gardens; cultivated and waste ground near settlements in the A.C.T.; naturalised in south-eastern Australia and Tasmania. 'Prickly Lettuce'. Fig. 402.

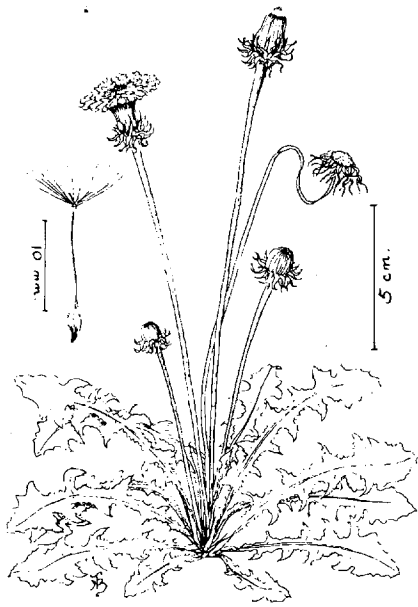
1. **L. serriola* L.

1a. Less robust than preceding, often less than 2 metres high; *stems smooth, without prickles*, of a pale colour contrasting with green of leaves which are not conspicuously vertical, pinnatifid with narrow linear acuminate distant lobes or narrow linear with narrow teeth in lower half, *margins entire, bases sagittate with acuminate auricles*; leafy bracts of inflorescence narrow with narrow acuminate auricles; *panicle narrow, usually almost spicate*; involucre 10-15 mm. long, very slender, bracts as in preceding; florets pale yellow, sometimes reddish on back but *turning dull blue on drying*; achene similar to that of preceding but ribs scabrid to summit and beak twice as long. In similar sites to preceding but much less common, often occurring as single plants; of similar origin and distribution. 'Wild Lettuce'.

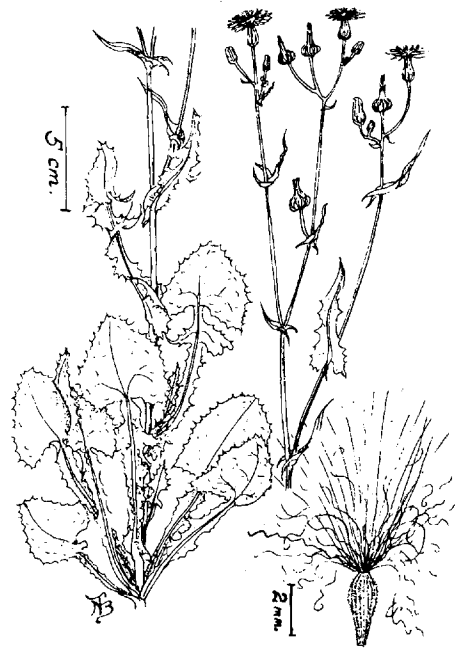
2. **L. saligna* L.

51. *CREPIS* L.

1. Hispid annual 30-70 cm. high, stems simple or branched from base, *with long simple hairs above finer curled or twisted ones and (on upper parts) with glandular hairs*; leaves radical, often purplish on undersurface, lyrate pinnatifid, acute or acuminate, winged lower margins narrowly lobed or toothed, withering early; stem leaves lanceolate to oblong, acuminate, with distant hooked lobes or almost entire, with acuminate auricles; heads terminal, solitary on branches of corymbose panicle, leafy bracts sagittate; *involucre drooping in bud, 8-10 mm. long in flower*, with few loose bracts near summit of glandular-hispid peduncle; outer involucral bracts half length of inner, apices slender-subulate, all bracts convex along midrib, *incurved margins giving ribbed appearance to head*; glandular hairs mixed with curled simple ones; florets orange-yellow, outer ones purplish on back, longer than involucre; *achenes dimorphic, marginal achenes closely embraced by bracts, 6-7 mm. long, finely striate, scabrid, acuminate but not or shortly beaked; disc achenes 12-15 mm. long, attenuate in slender scabrid beak*; pappus bristles fine, barbellate, 5-6 mm.



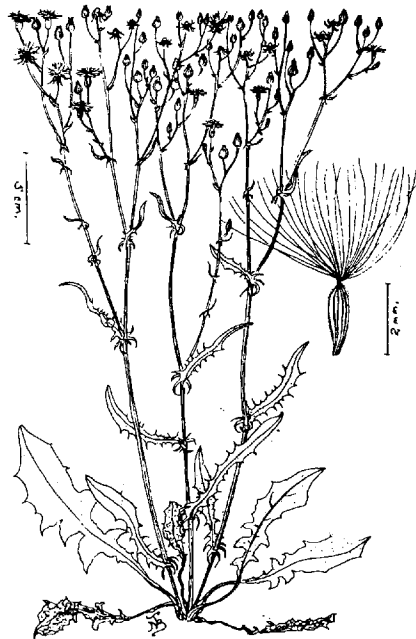
400. *Taraxacum officinale*



401. *Sonchus oleraceus*



402. *Lactuca serriola*



403. *Crepis capillaris*

long. Occasional weed of waste and cultivated ground or disturbed places at low altitudes. Of European origin; naturalised in southern and eastern Australia. 'Foetid Hawk's-beard'.

1. **C. foetida* L.

1a. Erect annual, 40-100 cm. high, branched low; stems striate, *sparsely hispid with crisped hairs or glabrescent*, glandular hairs present on panicle branches; basal leaves lyrate-pinnatifid, lobing irregular, lobes triangular or narrow; hispid or hairs only on often purple midrib of undersurface, withering early; stem leaves narrow lanceolate to linear, toothed, auricles narrow and curved; bracts of panicle entire or toothed; panicle corymbose, branches with glandular hairs above tangled simple ones; *involucre not drooping in bud, 6-7 mm. long in flower, not ribbed*; hairy like the branches; outer bracts loose; inner with pale glabrous scarious margins *not embracing achenes in fruit*; florets golden-yellow, not or scarcely tinted on back; *achenes all similar, ellipsoid, narrowed above but not beaked, 2 mm. long*, striate and smooth ribbed or scabrid above only; pappus of fine minutely barbellate bristles about twice as long as achene. Of European origin, naturalised in New South Wales, Victoria(?), Tasmania, and South Australia; in similar sites to the preceding but very common, extends to disturbed areas at high elevations, e.g. ski runs. 'Smooth Hawk's-beard'. Fig. 403.

2. **C. capillaris* (L.) Wallr.

52. CHONDRILLA L.

Rhizomatous perennial herb, radical leaves runcinate-pinnatifid, 8-12 cm. long, prostrate, margins entire or toothed; glabrous branched stems tangled but forming large panicle, branches subtended by narrow-linear leafy bracts; heads sessile, solitary or in small clusters; involucre narrow cylindrical, about 10 mm. long, short pedicel tomentose, inner bracts about eight, linear, thinly tomentose towards margins, later glabrescent; florets 10-12, yellow; achene pale, striate, scabrid above with crown of 4-5 obtuse scales around base of very slender beak; pappus of fine barbellate bristles from cupular base. Common noxious weed of gardens, cultivated or waste land, and pastures. Native to Mediterranean but occurring from southern Europe to central Asia, introduced to Canberra during 1914-15 drought period; also naturalised in southern and eastern Australia and Tasmania. 'Skeleton Weed'. Fig. 404.

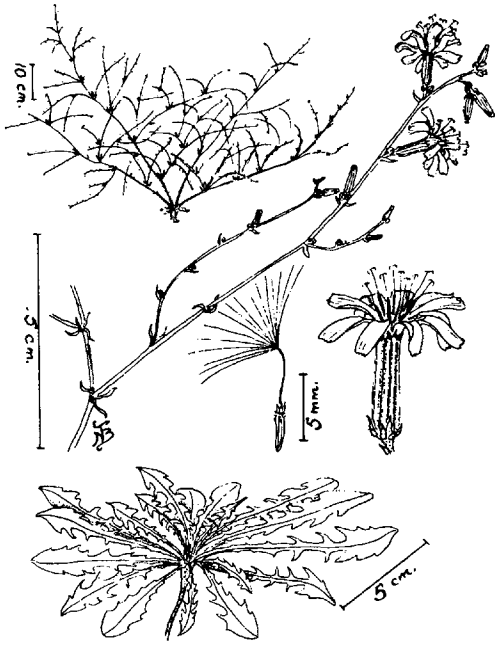
**C. juncea* L.

53. HYPOCHOERIS L.

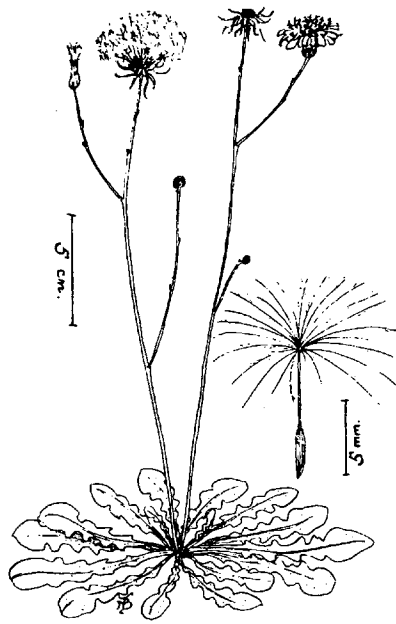
1. *Perennial* herb of variable size; leaves radical, obovate to oblanceolate, sinuately lobed to pinnatifid or entire when small, 3-20 cm. long, *coarsely hispid* with simple hairs; scapes often several per plant, branched, with minute distant bracts, sometimes reduced to single head with bud initial below, more or less hispid below, glabrous and striate above, somewhat swollen and hollow below involucre (often malformed by galls); involucre 10-15 mm. long, *bracts usually 30-35*, lanceolate, more or less hispid on midrib or subspinulose above; florets numerous, *the outer longer than involucre*, golden-yellow but greenish on back; achene brown, striate, scabrid above and attenuate with long or short smooth beak, pappus plumose. Very common weed of gardens, lawns, and cultivated ground, also widely naturalised among native plants at all elevations; throughout temperate Australia and Tasmania; native in Europe, Asia, and North Africa. 'Catsear', 'Flatweed'. Fig. 405.

1. **H. radicata* L.

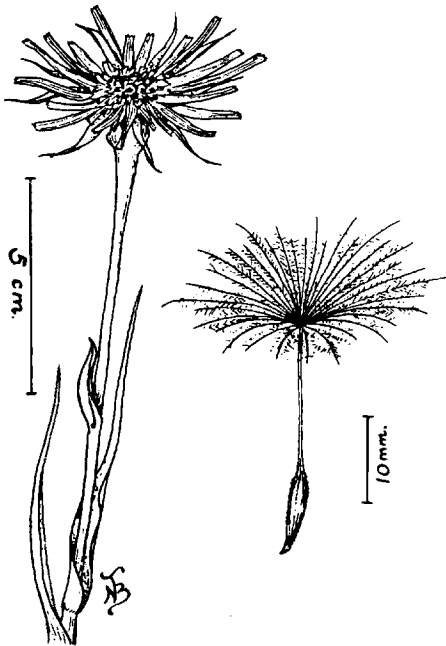
1a. *Annual* herb, often less than 15 cm. high (local plants); leaves similar to those of preceding but *glabrous or with rigid marginal cilia* or with sparse coarse hairs on upper surface and midrib of lower; involucre 8-12 mm. long, *bracts usually 14-20*, glabrous; florets golden-yellow, *the outer about as long as involucre*; achenes dimorphic, *marginal*



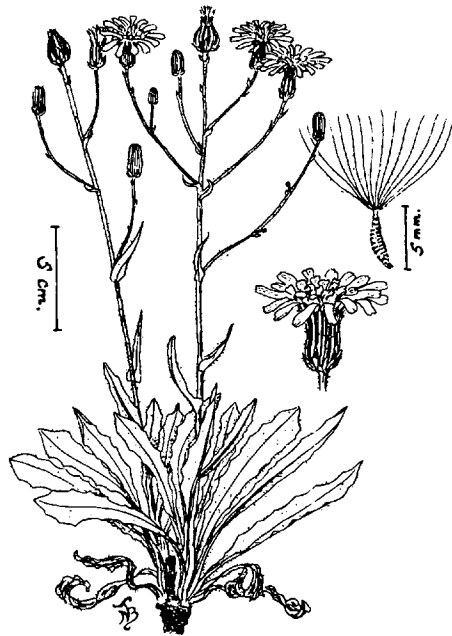
404. *Chondrilla juncea*



405. *Hypochoeris radicata*



406. *Tragopogon porrifolius*



407. *Picris hieracioides*

achenes without beaks, disc achenes beaked, otherwise as in preceding. In similar sites and of similar origin but less common locally. 'Smooth Catsear'.

2. **H. glabra* L.

54. **TRAGOPOGON** L.

Annual or biennial glabrous herb with thick tuberous taproot; basal leaves long, linear, to 60 cm. long, 5-10 mm. wide; stem leaves shorter with broader stem-encircling bases; stem to 1 metre high; heads solitary and terminal to main and upper branches, peduncle broadened and hollow at summit; involucre 3-5 cm. long, bracts about 8, long acuminate, tomentose-pubescent on inner face; glabrous outside; florets pinkish-violet to pale purple, irregular in length from $\frac{1}{2}$ to as long as bracts; achene about 14 mm. long, slightly curved, striate, more or less papillose-scabrid on ribs towards summit, narrowed to slender striate beak up to $1\frac{1}{2}$ times as long; pappus bristles about 20 mm. long, long-plumose but longer bristles barbellate towards apices. Native to southern Europe and North Africa. Naturalised near settlements in many parts of temperate Australia and Tasmania. 'Salsify'. Fig. 406.

**T. porrifolius* L.

55. **PICRIS** L.

Coarsely hispid-spinulose biennial or perennial herb 30-80 cm. high; hairs hooked with simple or bifid apices or a short crisped tomentum; radical leaves 7-15 cm. long, elliptical to oblanceolate with narrow base, sinuate and undulate or almost entire, margins spinulose with simple and bifid hairs; stem leaves similar but sessile; upper part of plant a bracteate panicle, heads pedunculate; involucre 10-15 mm. long, tomentose towards base and on summit of peduncle; bracts linear-lanceolate, sparsely tomentose except on margins, some with spinulose bristles up midrib; outer bracts short and loose; florets bright yellow; achene fusiform, slightly curved, reddish-brown, transversely wrinkled-scabrid, shortly attenuate below plumose pappus about $1\frac{1}{2}$ times as long. Common weed especially on disturbed areas at high elevations e.g. on ski runs. Native to Europe and Asia, naturalised in New South Wales, Victoria, Tasmania, South Australia, New Zealand and elsewhere. 'Hawkweed'. Fig. 407.

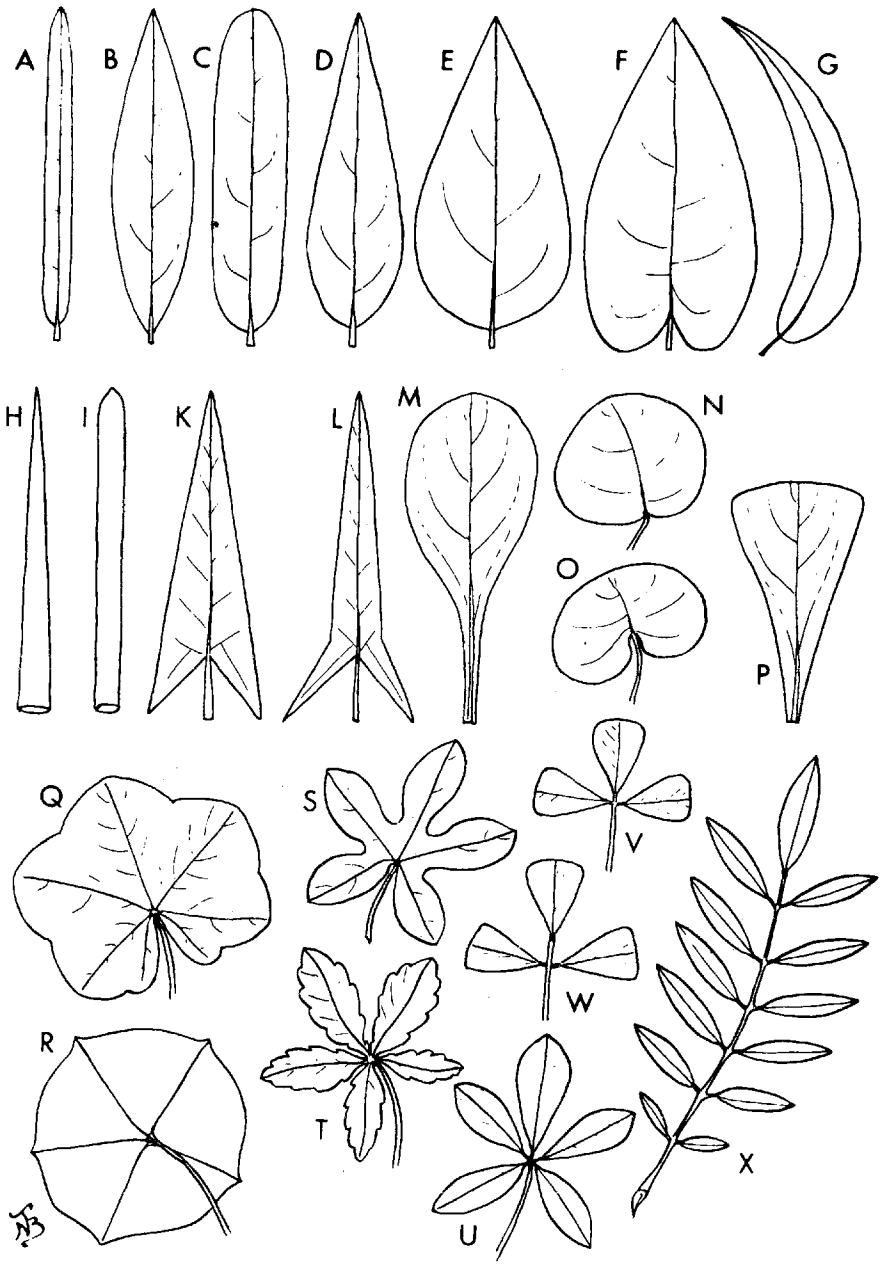
**P. hieracioides* L.

Note: **P. echioides* L. ('Oxtongue') has been collected as a casual on a rubbish dump at Black Mountain. It has oval to oblong stem leaves, the hooked bristles have more than 2 branches at summit; outer bracts of involucre are broadly cordate and conspicuously spinulose-ciliate on the margins; lanceolate inner bracts are spinulose on the midrib and the slender subulate apices; achenes oblong and abruptly narrowed to slender slightly longer beak, the marginal ones paler, pubescent and embraced by inner bracts.

GLOSSARY

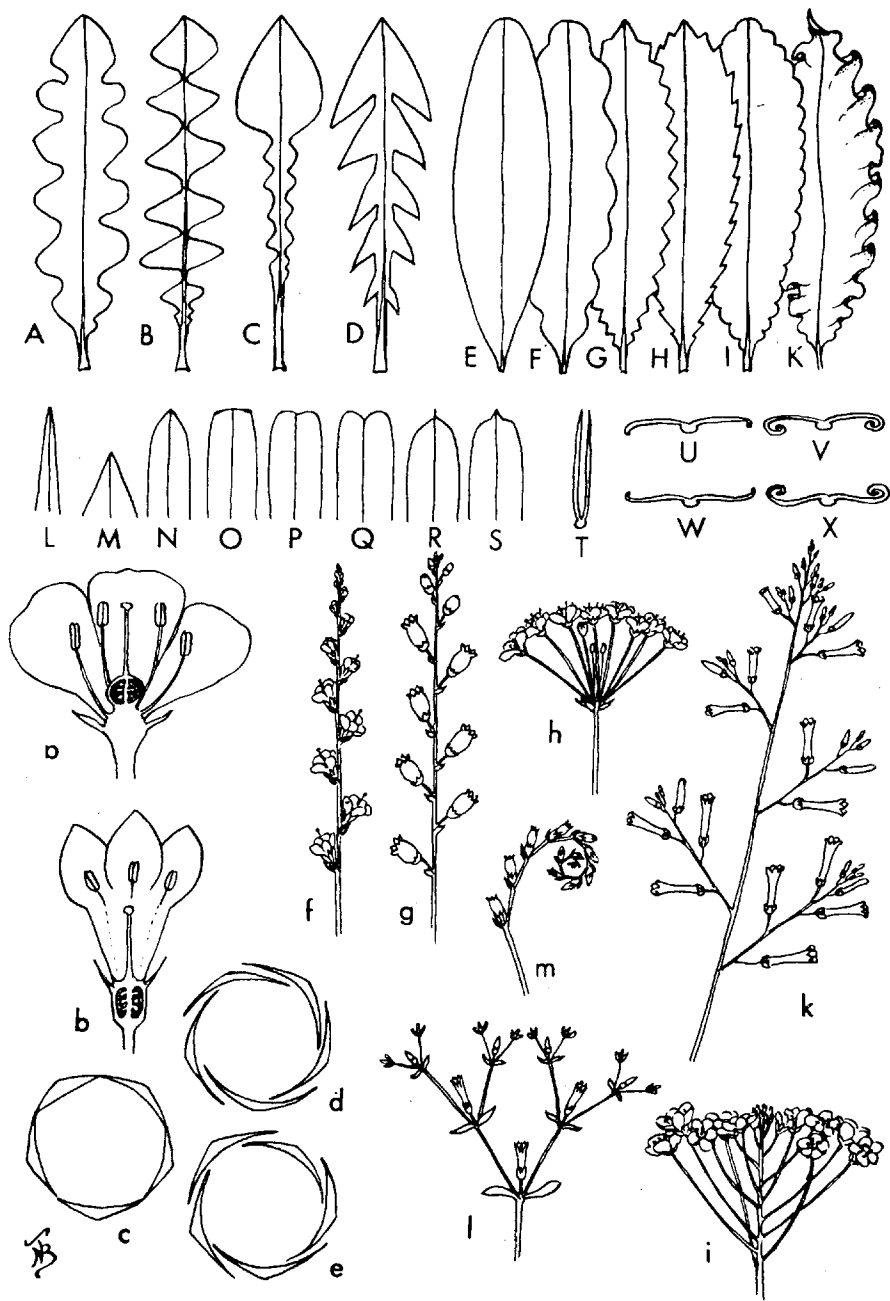
- Abaxial* Away from axis or stem.
- Achene* Indehiscent 1-seeded dry fruit as in Ranunculaceae and Cyperaceae. Long used for the seed in Compositae though in this case the fruit is formed of an inferior ovary and more properly called a *Cypsela* though not in this book.
- Acicular* Needle-shaped but narrowed to apex.
- Actinomorphic* Regular; used for flowers having sepals and petals not differing in shape or size in each whorl so that the flower can be bisected symmetrically in several planes.
- Acuminate* Tapering to a narrow point. Fig. 409L.
- Acute* Sharp, having a short sharp apex. Fig. 409M.
- Adaxial* Towards the axis or stem. cf. *Abaxial*.
- Adnate* Used when one part is fused to a part of a different type, e.g. when staminal filaments are adnate to the corolla tube or anther to filament. cf. *Connate*.
- Adpressed* Lying close against, used when parts of different organs are pressed together.
- Alveolate* Pitted or honeycombed.
- Annulate* Marked by raised rings or bands.
- Anther* Pollen-containing sac of the stamen, attached to top of staminal filament to which it may be *adnate* or *versatile*.
- Anthesis* Period when flowers are open, pollen is shed from the anthers to the stigmas and seed is 'set'.
- Antrorse* Used for hairs or roughness (scabridity) directed upwards, i.e. they may be felt if the stem or leaf is rubbed downwards. cf. *Retrorse*.
- Apiculum* Small point on the summit or apex. On a leaf it differs from a mucro in not merely consisting of an extension of the midrib; adj. = *apiculate*. Fig. 409S.
- Apomict* In general, a plant produced without fertilisation; adj. = *apomictic*.
- Appressed* Used when two parts of one plant organ are pressed together, e.g. the hairs on a leaf against its surface.
- Aristate* Bearing a bristle or awn.
- Articulate* Jointed, in some cases having a joint where fracture occurs.
- Ascendent* Stems curving or bending up into a more or less erect position.
- Attenuate* Becoming narrower and thinner.
- Auricle* With a projecting appendage. For *Auriculate* leaf see Fig. 408L.
- Awned* With one or more bristles or awns.
- Axillary* In the angle between the stem and the base of a leaf, or of a petiole of a leaf, or of a bract.
- Barbellate* Commonly used to describe the scabrid bristles of the pappus on the seed in Compositae.
- Bearded* With a beard of hairs, used when hairs are in a particular position and not distributed generally on a surface.
- Berry* A few or many-seeded indehiscent fleshy fruit.
- Bifid* Two-cleft at the apex.
- Bilabiate* Two-lipped.
- Biseriate* Arranged in two series, commonly on opposite sides of a stem.
- Boat-shaped* Concave but narrowed towards at least one end like the prow of a boat.
- Body* (of lemma) Basal part below apical lobes or awns.
- Bract* Dry or leafy structure from whose axil a flower or its stalk or the stems of an inflorescence arise.
- Bracteoles* Pair of bracts on the stalk of a flower. Sometimes placed at base of or on a calyx.

- Bulbous* Swollen, e.g. the swollen base of a stem or base of a hair.
- Caducous* Soon falling off.
- Caespitose* Growing in a tuft of stems and leaves.
- Callose* Thickened.
- Callus* A thickened area of plant tissue. Used for the hard, often pointed, base of lemmas in grasses, also for small thickenings elsewhere.
- Calyxine rim* Margin of the rim above the inferior ovary in Myrtaceae which bears the sepals, petals (or operculum in *Eucalyptus*) and the stamens.
- Calyx* Outer whorl of the flower when both sepals and petals are present. Made up of a number of sepals.
- Campanulate* Bell-shaped.
- Capillary* Very slender, hairlike.
- Capitate* Like a head.
- Capsule* Dry dehiscent fruit usually with several loculi or at least formed of several carpels if inner partitions are absent.
- Carpel* A cell of an ovary. In *Ranunculus* each achene is a free carpel.
- Carpophore* Prolongation of the receptacle above the sepals and petals (or perianth).
- Carunculate* Seed with a fleshy appendage (*caruncle*) near the point of attachment to the ovary wall.
- Castaneous* Chestnut-brown.
- Caudate* With slender tail-like appendage.
- Cauline* Belonging to or on the stem.
- Chartaceous* Stiffly papery, like parchment, chaffy but not soft.
- Chasmogamous* Flowers which open normally, as opposed to cleistogamous.
- Circinnate* Curved in a circle, also coiled downwards as in a young fern frond.
- Ciliate* Fringed with fine hairs (cilia).
- Ciliolate* Fringed with minute cilia.
- Circumsciss* Splitting along a horizontal circular line as when top or lid of fruit breaks away.
- Clasping* As when the base of a leaf or petiole is folded around the stem.
- Clavate* Club-shaped.
- Claw* Narrow base of petal below broader or spreading *limb*.
- Cleistogamous* Flowers which fail to open but which are self-pollinated in the closed condition.
- Column* The structure formed of the jointed stamens and style in orchids, also used for the lower part of an awn in some grasses.
- Comal hairs* Tuft of fine hairs attached to the end of a seed.
- Commissure* The area of contact between two carpels, e.g. in Umbelliferae.
- Compact* Used to describe a grass panicle in which the branches and spikelets lie close against each other.
- Compound* Leaves in which the blade is divided into leaflets or an inflorescence composed of simple inflorescences as in a panicle.
- Compressed* Flattened.
- Conduplicate* Folded together like a once-folded piece of paper. Fig. 409T (section through conduplicate leaf).
- Connate* Fusion of parts in a whorl of a flower, e.g. petals fused in a tubular corolla. cf. *Adnate*.
- Connivent* Linked but not as closely fused as in connate.
- Contorted* Twisted, petals each with one edge overlapping the next petal. Fig. 409d.
- Contracted* Reduced or narrowed.
- Convolute* Rolled into a tube or cylinder.
- Cordate* Heart-shaped in outline with broad part at base and rounded lobes on either side of attachment to petiole. Fig. 408F.
- Coriaceous* Stiff and hardened but flexible.
- Corolla* Whorl of petals which may be free or connate.
- Corymb* Raceme with pedicels graded in length so that the flowers lie in same horizontal plane. Fig. 409i.



408. Leaf shapes

- Crenate* With rounded marginal lobes. Fig. 409I.
- Crenulate* With small rounded lobes.
- Crisped* Minutely undulate as on margin, also used for curled hairs.
- Cucullate* Like a narrow conical cap split on one side or hooded.
- Culm* Jointed stems of grasses or sedges which bear the terminal inflorescences.
- Cuneate* Wedge-shaped with broader part at summit. The opposite of deltoid. Fig. 408P.
- Cyathium* The special type of inflorescence developed in *Euphorbia*. See p. 245.
- Cyme* Branched inflorescence in which each flower is terminal to a shoot, the branches thus being a compound series of axillary shoots. Fig. 409I-m.
- Cypsela* See under *Achene*.
- Deciduous* Not persisting from one season to the next; falling early.
- Decumbent* Prostrate stems with apices turning upwards from the soil.
- Decurrent* Blade of leaf or of winged petiole extending down the stem below point of attachment.
- Deflexed* Turned or bent abruptly downwards.
- Dehiscent* Opening to release seeds.
- Deltoid* Triangular with broad base.
- Dentate* Toothed (margin). Fig. 409G.
- Denticulate* Finely toothed.
- Depauperate* In poor condition, starved or reduced in size.
- Dichotomous* Branching by dividing into pairs of shoots.
- Diffuse* Loose and open with few branches or stems.
- Digitate* Spreading as with fingers from a hand, a number of leaflets or branches of an inflorescence arising from one point at the apex of a petiole or stem. Fig. 408U-V.
- Dioecious* With male and female flowers on different plants.
- Distal* Towards the free end or apex (remote from place of attachment) cf. *Proximal*.
- Distichous* Regularly arranged in opposite rows or alternately on opposite sides of shoot or stem.
- Divaricate* Spreading widely apart.
- Divergent* Spreading apart.
- Dorsal* Back; abaxial surface of leaf when erect against stem or the outer exposed surface of a bract in an involucre and thus equivalent to the undersurface of a spreading leaf blade.
- Drupe* Fleshy indehiscent fruit commonly of one carpel, e.g. plum. Consists of epicarp (skin), mesocarp (flesh), and endocarp (hard kernel).
- Druplet* Small drupe.
- Ellipsoid* Solid body elliptical in outline.
- Elliptical* Outline broadest across the middle and narrowed to both ends. Fig. 408B.
- Emarginate* Apex with shallow notch. Fig. 409P.
- Endocarp* Hard inner part of the fruit wall.
- Entire* With plain unlobed margin. Fig. 409E.
- Epicalyx* Outer whorl of sepal-like bracteoles at base of true calyx.
- Epicarp* Skin of a drupe or outer part of covering on a nut.
- Epidermal* Belonging to the skin or epidermis.
- Erose* Worn or torn and tattered, ragged.
- Exocarp* Outer layer of the pericarp or fruit wall.
- Exserted* Protruding as when stamens project beyond the mouth of the corolla tube.
- Falcate* Curved or sickle-shaped. Fig. 408G.
- Female* Flower having pistil and therefore able to set and ripen seeds.
- Ferruginous* Rust-coloured.
- Filament* Mostly used for the filaments of the stamens which bear the anthers at their summits.
- Filiform* Filamentous, finely hairlike.
- Fimbriate* With the margin finely split in a fringe.
- Flaccid* Limp, the opposite of turgid.
- Flexuose* Stem bent alternately in opposite directions.



409. Leaf margins, apices, inflorescences, and flower construction

- Floret* Individual flower in a head *or* the stamens and pistil enclosed by a lemma and a palea in a grass spikelet.
- Follicle* Dry dehiscent fruit of one carpel which splits on one side.
- Funicle* Stalk of the ovule (which later becomes the seed).
- Fuscous* Dark brown.
- Fusiform* Spindle-shaped, like two cones base to base.
- Galea* Hood formed of the dorsal sepal and two petals in the orchid genus *Pterostylis*.
- Gammae* Like the capital of the Greek letter *gamma*; like head of a golf club.
- Geniculate* Bent like a knee or elbow.
- Gibbous* Swollen on one side, commonly used for a pouch-like swelling at the base of an organ.
- Glabrescent* Becoming glabrous.
- Glabrous* Without surface hairs.
- Glandular* With glands. In the case of epidermal hairs glands may form globular, often dark, apices.
- Glaucous* With a waxy bloom, e.g. the 'bloom' on a grape or plum.
- Glumaceous* Resembling glumes.
- Glume* The bracts (normally two) at the base of a grass spikelet *or* the bracts subtending the florets in the inflorescence of Cyperaceae.
- Gynophore* Stalk of an ovary when elevated above attachment of the stamens.
- Gynostemium* Fused stamens and pistil which forms the 'trigger' in Stylidiaceae.
- Hastate* Leaf shape with spreading (often triangular) lobes at the base. Fig. 408L.
- Head* Inflorescence with sessile flowers (florets) densely clustered on the top of the peduncle (receptacle).
- Herb* Plant whose stems do not become hard and woody with dry bark.
- Hermaphrodite* Bisexual flower, i.e. contains both stamens and pistil.
- Hirsute* Hairy with hairs longer than in pubescent and coarser and stiffer than in villous.
- Hispid* With stiff rather sparse hairs, less bristly than in strigose.
- Hispidulous* The hispid condition.
- Hoary* With whitish, often rather mealy or scurfy hairs or scales.
- Hyaline* Thin and transparent.
- Hypogynous bristles* Bristles placed below the ovary in certain species of Cyperaceae.
- Imbricate* Overlapping like tiles. In the flower petals overlapping but one petal with both sides free. Fig. 409e.
- Imparipinnate* Pinnate leaf with a single terminal leaflet. Fig. 408X.
- Incised-annulate* With circular grooves.
- Incurved* Margin turned upwards and inwards but not rolled. Fig. 409V.
- Indehiscent* Not opening to release seeds.
- Indurate* Hardened, horny.
- Indusium* The tissue covering the sporangia in ferns *or* the cup on the top of the style in Goodeniaceae.
- Inferior* Lower *or*, in the case of an ovary, placed below the other parts of the flower. In this state the ovary is regarded as being embedded in the tissue of the receptacle (summit of peduncle *or* pedicel). Fig. 409b.
- Inflorescence* Simple *or* branched shoot bearing the flowers with *or* without modified leaves *or* bracts.
- Inrolled* Margins turned up and rolled in towards the central line *or* the midrib. Fig. 409X.
- Internode* Portion of stem between two adjacent nodes.
- Involute* Group *or* ring of bracts surrounding an organ, e.g. around the head in Compositae.
- Involute* See *Inrolled*.
- Irregular* Used for flowers in which the petals are of differing shapes *or* sizes *or* which can be divided symmetrically on one plane only. Also called *Zygomorphic*.
- Isodiametric* With vertical and horizontal diameters equal.
- Keel petals* The two lower petals which cover the stamens and pistil and form the 'keel' in a pea-type flower.

Keeled Used when a leaf blade or a bract has a midrib prominent on the undersurface like the keel of a boat.

Labellum One of the petals in an orchid flower which is commonly modified and different from the others; *also* for the fifth (minute) petal in *Stylidium*.

Laciniate Margin irregular, torn rather than toothed.

Lacunae Shallow pits or depressions.

Lamina Blade of a leaf, or broader part (limb) of a petal.

Lanceolate Lance-shaped. Fig. 408D.

Lax Loose and more or less nodding.

Lemma Bract in a grass spikelet which covers the stamens, pistil, and palea.

Lenticular Lens-shaped, convex on both sides.

Ligulate Florets in the head of a Composite flower split to form a 'petal' as in (2) below.

Ligule (1) Membrane or row of minute cilia at the junction of sheath and blade in a grass leaf or
(2) the petal-like corolla of the outer florets in heads of Compositae e.g. Daisy.

Limb Lamina of a petal above a narrow claw base.

Linear Straight-sided and narrow. Fig. 408A.

Loculicidal Fruit which splits or opens by pores on the wall of each cell or *loculus*.

Lunate Crescentic.

Lyrate Pinnately lobed leaf with apical segment conspicuously longer and larger than the lower lobes. Fig. 409C.

Male Flower containing or consisting of stamens but lacking a functional pistil.

Membranous Thin and delicate.

Mericarp The half fruit into which the two carpels split in Umbelliferae also the carpels which separate from the carpophore in Geraniaceae.

Mesocarp Fleshy or dry part of a drupe between the epicarp and endocarp.

Monoecious With male and female flowers on the same plant.

Mucronate With short stiff point (*mucro*) often composed of an extension of the midrib. Fig. 409R.

Muricate Covered with short stiff points or outgrowths.

Napiform Turnip-shaped.

Nervate With nerves or veins.

Nodding Bending over and hanging down.

Node Joint of stem, commonly bearing a leaf or leaves.

Nodulose With swollen joints or appearing jointed due to internal septa.

Nut Dry indehiscent fruit containing one seed. (Commonly used in a broader sense in non-botanical language.)

Oblanceolate Reverse shape to lanceolate; attached at narrow end and broadest in upper third.

Oblong Longer than broad with sides parallel for most of their length and with rounded ends. Fig. 408C.

Obovate Reverse shape to ovate.

Obovoid Reverse shape to ovoid.

Obtuse Blunt. Fig. 409N.

Orbicular Circular in outline or almost so. Fig. 408N.

Orifice Mouth of corolla tube in flower or the opening at the top of the leaf sheath in grasses.

Oval Between oblong and elliptical.

Ovary Organ containing ovules at the base of the pistil. Later forming the fruit containing seeds.

Ovate Egg-shaped in outline, attached at broader end. Fig. 408E.

Ovoid Egg-shaped solid body, attached at broader end.

Palea Small bract which covers the stamens and pistil in the axis of a lemma of a grass spikelet.

Palmate Shaped like the palm of a hand, the main veins spreading from attachment to petiole. Fig. 408Q.

Palmatifid Deeply lobed palmate leaf blade. Fig. 408S.

Palmaisect Palmate leaf lobed to base, i.e. to top of petiole. Fig. 408T.

Pandurate Fiddle-shaped, leaf shape broadened above and below.

Panicle Branched inflorescence. Fig. 409k.

Papillose Covered with small usually blunt outgrowths or papillae.

Pappus Tuft of hairs, bristles or scales, e.g. on top of an achene in Compositae.

Parasite Plant obtaining all or part of its nutriment from another plant.

Paripinnate Pinnate leaf with paired leaflets and no single terminal one. See *Imparipinnate*.

Patent. Spreading.

Pedicel Stalk of flower in an inflorescence as compared with peduncle of inflorescence or of solitary flower; adj. = *pedicellate*.

Peduncle Stalk of solitary flower or of an inflorescence.

Peltate Leaf blade attached to petiole by its lower surface rather than the margin. Fig. 408R.

Perianth Sepal or petal-like part of flower in which only one whorl surrounds the stamens and pistil or in which two are not distinguishably different.

Pericarp Wall of the ovary which becomes that of the fruit. In an inferior ovary the pericarp is fused with the receptacle in which the ovary is embedded.

Perigynous Flower in which the receptacle is cupular with sepals, petals, and stamens on the rim and the pistil free in the base of the cup.

Petaloid Coloured like or similar to a petal.

Petiole Stalk of a leaf; adj. = *petiolate*.

Petiolule Stalklet of a leaflet in a compound leaf.

Phyllode Petiole modified to act as a leaf.

Pilose With long but not dense soft hairs.

Pinna Primary segment or leaflet of a pinnately compound leaf.

Pinnate Compound leaf with leaflets on either side of midrib. (*Bipinnate* = doubly pinnate). Fig. 408W-X.

Pinnatifid Pinnately lobed. Fig. 409A.

Pinnatisect Pinnately lobed to the midrib but without distinct leaflets. Fig. 409B.

Pinnule Segment or leaflet of a pinna in a bipinnate or compoundly pinnate leaf.

Pistil Gynoecium or 'female' part of flower, consisting of ovary at base and stigma terminal to a style or branch of style or attached directly to top of ovary.

Plano-convex Convex on one side, flat on the other.

Plicate Surface with longitudinal folds.

Plumose Feathery.

Pod Dehiscent fruit characteristic of the Leguminosae.

Procumbent Trailing on the ground.

Proliferous Developing adventitious leafy shoots in the place of flowers or florets.

Prostrate Lying flat against the ground.

Proximal Towards the point of attachment. cf. *Distal*.

Puberulent Minutely downy.

Pubescent Downy, covered with dense short soft hairs.

Punctate Marked with minute dots or pits.

Puncticulate Minutely punctate.

Pungent With a needle-sharp hard point.

Pyramidal With an outline resembling that of a pyramid.

Pyriiform Pear-shaped with stalk at narrow end.

Quadrangular Four-sided and angular.

Raceme Simple inflorescence with pedicellate flowers. Fig. 409g.

Radical Leaves clustered at base of stem close to or on the summit of the root or rootstock.

Ragged Torn or split, not distinctly lobed or toothed.

Receptacle Summit of stalk bearing flowers or the florets in a head. Fig. 409a-b.

Recurved Bent or curved downwards. Fig. 409U.

Reflexed Turned sharply backwards.

Reniform Kidney-shaped.

Resinous Sticky with secreted resin.

Reticulate With veinlets in a network.

Retorse Scabridity or surface hairs turned downwards and hence felt when rubbed upwards.
cf. *Antrorse*.

Retuse With shallow notch between rounded lobes. Fig. 409Q.

Revolute Margin turned down and rolled towards midrib. Fig. 409V.

Rhachilla Axis of a spikelet in Cyperaceae or Gramineae.

Rhachis Axis of an inflorescence, the flower-bearing part above the peduncle.

Rhizome Underground more or less horizontal stem. cf. *Stolon*.

Rhomboid Diamond-shaped, like two triangles base to base.

Rootstock Underground butt of plant capable of producing new growth each year.

Rosette Cluster of radical leaves.

Rostellum Appendage on stigma in some orchids.

Rudimentary Reduced to a rudiment.

Rugose Rough and wrinkled.

Rugulose Finely rugose.

Runcinate Toothed or lobed leaf with teeth or lobes pointing towards base. Fig. 409D.

Saccate Pouched, with a sac or pocket.

Sagittate Arrow-shaped, leaf blade with straight pointed lobes at base. cf. *Hastate*. Fig. 408K.

Saprophyte Plant which derives its food wholly or partially from dead organic matter.

Scabrid Rough, surface with minute outgrowths too short to call hairs.

Scabridulous Finely scabrid.

Scape Peduncle arising basally i.e. from rootstock or butt of plant; adj. = *scapose*.

Scarious Thin, dry, and more chaffy than membranous, less stiff than chartaceous.

Schizocarp Fruit in the Geraniaceae in which the loculi (mericarps) split away from the central axis (carpopore).

Sclerophyll Term for the hard-leaved type of plant common in Australia e.g. **Eucalyptus**.

Scorpioid Coiled, curled like a scorpion's tail. Fig. 409m.

Secund Having the organs turned to one side, e.g. an inflorescence with the flowers or spikelets turned to one side of the rhachis.

Septate Marked by septa or internal transverse partitions.

Septicidal Fruit in which the ovary wall splits at and on the septa or partitions between the cells. cf. *Loculidical*.

Seriate In series.

Sericeous Silvery or silky with appressed hairs.

Serrate Toothed like a saw. Fig. 409H.

Serrulate Finely saw-toothed.

Sessile Without a stalk.

Setaceous With bristles or *setae*. Also *setose*.

Setulose With fine bristles.

Sheath Used in a particular sense for the stem clasping part of a leaf.

Silicula Dry fruit in Cruciferae which is less than three times as long as broad. See *Siliqua*.

Siliqua Dry fruit of Cruciferae more than three times as long as broad; the two valves breaking away from the central partition from the base upwards.

Sinus Gap or notch between two lobes.

Sinuate Margin with broad shallow rounded lobes. Fig. 409F.

Spathe Large bract or pair of bracts folded around the developing flower or inflorescence.

Spathulate Spoon-shaped in outline. Fig. 408M.

Spike Simple inflorescence with flowers sessile on the rhachis. Fig. 409f.

Spikelet The small spikes bearing one or more florets in the Cyperaceae and Gramineae.

Spinose Bearing or ending in spines.

Spinulose With small or fine spines.

Spur Slender protruberance formed at the base of the corolla in some flowers.

Stamen Male organ of flower, consisting of filament and pollen-containing anther.

Staminodia Sterile stamen, often reduced or modified.

Standard petal Upper petal (often the largest) in a pea-type flower.

Stellate Branched hairs with spreading points or star-shaped.

Sterile Flowers or florets lacking both stamens and pistil or in which these organs do not function. In some Compositae heads the disc florets may have sterile achenes though they produce pollen in their anthers and have styles.

Stigma Receptive part of the pistil to which the pollen becomes attached during pollination.

Stipellae Minute stipules sometimes found at base of leaflets in compound leaves.

Stipe Minute stalk.

Stipitate Stalked.

Stipule Outgrowth (scarious, membranous, or leafy) sometimes developed at base of petiole or, in sessile leaves, on either side of point of attachment to stem.

Stolon More or less horizontal stem rooting at the nodes but at least partly above ground.

Stomata Special pores developed (especially on leaves) in the epidermis, consisting of a pair of guard cells which open to permit gas exchange from and to leaf tissue.

Stramineous Straw coloured.

Striate Marked by fine longitudinal grooves or ridges.

Strigose Covered with stiff bristly often appressed hairs.

Style Part of pistil between ovary and stigma, sometimes lacking.

Subtend Lie below; used for leaves which subtend branches (in their axils) or bracts which subtend flowers or their pedicels.

Subulate Awl-shaped, cylindrical but tapering upwards. Fig. 408H.

Sulcate Grooved or furrowed.

Superior Used to describe ovary placed above attachment of other parts of the flower (which is then called *hypogynous*) Fig. 409a.

Synonym A second name belonging to a species but published later than the correct one or illegitimate for some other reason.

Tepals Organs similar to sepals or petals found in flowers where the two types are not clearly differentiated. cf. *Perianth*.

Terete Cylindrical. Fig. 408I.

Ternate Three-lobed.

Testa Seed coat.

Thalamus See *Receptacle*.

Tomentose Clothed with dense tangled woolly or matted hairs.

Torus See *Receptacle*.

Trabeculate Cross-barred.

Trichome Epidermal hair or bristle.

Trichotomous Branching into threes.

Trifoliolate With three leaflets; digitately so if from summit of petiole (Fig. 408V), pinnately so if central one is from an extension of the axis. (Fig. 408W.)

Trigonous Three-sided; triangular in cross section.

Triquetrous Three-angled with projecting ridges or wings.

Truncate Cut off squarely. Fig. 409O.

Tubercle Small swelling. Sometimes found as bases of hairs which are therefore described as *tuberculate*.

Tuberous With a swollen root or rhizome.

Turbinate Top-shaped.

Turgid Firm and full of sap, or firmly inflated.

Umbel Inflorescence with pedicellate flowers arising from top of peduncle. Fig. 409h.

Undulate Wavy, used for corrugated leaf margins. Fig. 409K.

Urceolate Urn-shaped.

Utricle Dry or membranous cover of seed in some plants, e.g. *Carex* (Cyperaceae).

Valvate Position in bud when sepals and petals have margins touching but not overlapping (as they do in the *imbricate* position). Fig. 409c.

Valves Parts into which the wall of a fruit may split to release seeds.

Verrucose With a warted or nodular surface.

Versatile Anthers more or less centrally attached to the apex of the staminal filaments and often swinging loosely. cf. *Adnate*, where they are fused to the upper part of a filament for at least part of their length.

Verticillate Whorled; with a group of leaves or branches from a node or nodes.

Vestigial Reduced to a rudiment.

Vestiture Covering of hairs or bristles.

Villous With dense long soft hairs.

Viscid Sticky.

Vittae Aromatic oil tubes of fruit of some Umbelliferae.

Whorl Ring of organs of the same kind, e.g., whorl of leaves at a node.

Wing petals Lateral petals on either side of the keel petals in a pea-type flower.

Woolly Softly hairy with hairs coiled or tangled but scarcely tomentose.

Xerophytic Adapted to dry climatic conditions.

Zygomorphic See *Irregular*.

ADDENDA

Additional Records for the Australian Capital Territory

- Brachycome heterodonta** DC. (syn. *B. marginata* Benth.) (Compositae).
Caladenia tessellata R. D. FitzG. (Orchidaceae): Black Mountain area and western slopes of Mt Ainslie.
Caleana minor R.Br. (Orchidaceae): Black Mountain.
Celmisia asteliaefolia J. D. Hook. (Compositae) included with *C. longifolia*.
Chamaecytisus prolifer (L.f.) Link (Papilionaceae): Black Mountain and lower slopes of Mt Jerrabomberra (near Queanbeyan, N.S.W.) (introduced).
Cheiranthra cyanea Brongn. (syn. *C. linearis* A. Cunn.) (Pittosporaceae), Mulligans Flat area.
Dillwynia prostrata Blakely (Papilionaceae), Mt Clear area.
Drosera gracilis J. D. Hook. (Droseraceae): Booroomba and Mt Gingera.
Drymophila cyanocarpa R.Br. (Liliaceae): Two Sticks Road between Piccadilly Circus and Mt Coreé.
Galium propinquum A. Cunn. (Rubiaceae): Tidbinbilla Fauna Reserve.
Helichrysum rutidolepis DC. (Compositae): Lyneham area.
Juncus gregiflorus L. Johnson (Juncaceae): Five Crossings on Condor Creek.
Luzula australasica Steud. (Juncaceae): Mt Ginini, Mt Gingera.
L. meridionalis Nordensk. var. *flaccida* (Buchen) Nordensk. (Juncaceae): Canberra, Five Crossings, Wark's Road in Cotter Valley, Mt Ginini, Mt Gingera.
L. meridionalis var. *densiflora* Nordensk. (Juncaceae): Uriarra Crossing on Murrumbidgee River, Paddy's River. (See Nordenskiöld in *Bot. Notiser*, 122: 69-89 (1969) for account of Australian species.)
Lyperanthus suaveolens R.Br. (Orchidaceae): Black Mountain.
Pentstemon airoides (Nees) Stapf (Geminaceae): Queanbeyan area (N.S.W.) (introduced).
Rorippa sp. (*R. stylosa* (DC.) Allan—nom. illeg.) (Cruciferae): Lee's Creek.
Silene nocturna L. (Caryophyllaceae): Lower slopes of Mt Ainslie (introduced).

Additional Locality Records

- Potamogeton ochreatus** Raoul (Potamogetonaceae): Lake Burley Griffin.
Ranunculus papulentus Melville (Ranunculaceae): East Gippsland (Vic.)

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